

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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## Flight

The Aircraft Engineer and Airships

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## EDITORIAL COMMENT

**B**Y Royal Warrant His Majesty has been pleased to approve a series of new titles for officers of the Royal Air Force. Although some of the new ranks have a sound to the ear which is at first a little incongruous, it is simply because they are strange, and use and custom will speedily remove the feeling of strangeness with which such titles as "marshal of the air," will be used. The departure from military titles is a wise and thoroughly sound move. It is one we have advocated from the moment the decision was taken to constitute the R.A.F. as it now is. Above all things it is essential to develop and foster in the Air Service that best

of all traits leading to sound *esprit de corps* which can only be described, inadequately it is true, as exclusiveness. By that we mean the pride in a Service which stands apart, though not aloof, from all other Services—a pride which is at its highest in the Royal Navy, and which has made that Service in great measure what it is. In order to maintain that spirit of exclusiveness—or self-containedness would possibly better describe what we mean—it is essential that there should be neither room nor opportunity for confusion, even in such a matter as the titles by which its officers and men are called. The borrowing of Air Force titles from the Army we have always held to have been a very serious mistake. As we pointed out when these titles were adopted, it would have been far better to have taken over the old R.N.A.S. ranks of Squadron-Commander, Flight-Commander, and the rest than to have rated everyone Colonels, Majors and the like.

What has been done now is practically to adopt the R.N.A.S. system of nomenclature, with certain slight modifications which are quite insufficient to obscure the source of their inspiration. In the higher ranks, of course, new titles have been coined. Obviously, the supreme rank could have been neither Field-Marshal nor Admiral of the Fleet, so a not unhappy combination of the two has been made, with the resultant that the highest rank to which an officer of the R.A.F. can attain is Marshal of the Air. Who, beside the Sovereign, who as chief of the R.A.F. will automatically take the rank, will be the first to be honoured with the bâton?

### Airship Control

It has now been definitely decided that airships are to be transferred from the Admiralty to the Air Ministry. This was announced in the House the other day by Mr. Bonar Law, who was called upon to answer a series of questions put by Lieut.-Col. Malone, who was very curious to know exactly what was to happen. Some of these questions were so apparently aimless as to suggest that the enquirer had a good deal less knowledge of his subject than he should have possessed. But to those who know the course things were taking with regard to this question of the control of lighter-than-air craft, all these seemingly superfluous queries had a distinct purpose behind them.

The fact of the matter is that the negotiations between the Admiralty and the Air Ministry have been dragging on for some time. The former desired to retain control, and the latter was at one time—and that very recently—inclined to give way. It was only that very broad hints of impending trouble if the Air Force were split in the way contemplated reached the right quarter which really brought the question to a head last week, and, what is better, resolved it satisfactorily. Even after it had been decided that the airships were to pass over to the Air Ministry, there were suspicions that all was not as clear as might be, and hence the questions. However, the future is settled, and the R.A.F. is to be as Parliament intended it should be, a separate, united and independent Force.

It is worth while referring to certain aspects raised by the questions. A great point was made of the desire to know whether airships working with the Fleet are to be under the orders of the Air Ministry or of the Admiralty. It is perfectly clear that when aircraft are working either with the armies in the field or fleets at sea they must be, for operations, under the sole command of the commander-in-chief or of officers of general rank delegated by him to carry out certain military tasks. There can be no question about this. Any other system would be fore-doomed to failure and disaster. But they will not be under the War Office or the Admiralty, as the case may be, and it was in order to clear up the situation that the apparently futile questions were put. Administratively, units of the R.A.F. will always remain as much under the Air Ministry as a Naval contingent serving with troops ashore is under the Admiralty. In such a case, the force retains all its Naval status, and is as much subject to Admiralty administration as ever, although for purposes of military command it must take the orders of the senior military authority on the spot.

Now, so long as it is understood that this is to be the status of R.A.F. units working with the fleets or armies, the position is unexceptionable. But there was an uneasy suspicion in the minds of the questioners that something different was intended under the cloak of the taking over of the airships by the Air Ministry. We do not say whether it was justified or not, but it was thought that the taking over was to be purely nominal, and that airships actually supplied for naval purposes would be handed over to the Admiralty, lock, stock and barrel, to become not only under the military command of the Navy, but to be under Admiralty administration as well. Whether that was the intention of the powers that be or not, it has been very effectually put to one side, and we feel that Col. Malone and those who were with him, in insisting that full information should be given the House, are deserving of the thanks of all who believe in the Royal Air Force one and indivisible.

◆ ◆ ◆  
**German  
Airships  
for the  
R.A.F.?**

Arising in some part out of the foregoing discussion of the fight for the control of the airship branch—for it has been nothing less—it is interesting to note the reply of Gen. Seely to Col.

Moore-Brabazon on the subject of the allocation of German airships. The latter desired to know how many airships would be allocated to this country under the terms of Peace, and whether they would pass under the control of the Admiralty or of the

Air Ministry. The Under-Secretary was not too precise in his answer. All the information he vouchsafed was that under the Peace terms all German airships are to be handed over to the Allies, but the exact number allotted to this country has not yet been decided. The airships will be taken over in Germany by the R.A.F. Section of the Inter-Allied Aeronautical Commission of Control, and their allotment as between the Admiralty and the Air Ministry will be determined by the decision made on the general question of responsibility for airships!

So that at the time this answer was given—one day last week—the "general question of responsibility for airships" had not been decided! It would seem as though there had been need for pressing and searching questions on the matter of policy regarding airship control. Undoubtedly a very ugly situation has been very narrowly avoided.

◆ ◆ ◆  
**Air  
Navigation  
Rules**

The Air Ministry has thought it necessary to issue the following important notification to aviators and firms engaged in civil flying:—

It is notified that, though the Air Navigation Regulations have been in force since May 1, and it is felt that pilots and others have now had ample opportunity of acquainting themselves with the regulations, numerous instances of their infringement are still being reported. The regulations were made with a view to securing the public safety, and in future proceedings will be taken when they are contravened. The public are requested to co-operate with the Air Ministry in this matter by forwarding to the Secretary (C.G.C.A.), Air Ministry, London, particulars of alleged offences, including, if possible, the registration number or mark of the machine in question.

The most common instances of infringement are:—

1. Dropping of leaflets and other advertising matter. (For the purposes of the Victory Loan campaign the Secretary of State for Air waived the provision in the regulations against the dropping of leaflets from aircraft, but the exemption has now been withdrawn.)
2. Taking up and landing passengers as a regular proceeding at places which have not been licensed as aerodromes.
3. Low flying—(a) over towns; (b) to the danger of the public elsewhere.
4. Neglecting to obliterate military markings when a machine has ceased to be a military machine.
5. Obscuring registration marks by means of advertisements or otherwise.

We are quite in accord with the determination of the Ministry to suppress dangerous flying over populous areas, and for the sake of the cause of safety we trust that the appeal to the public to assist in bringing offenders to book will bear fruit. But there is one aspect of the matter to which we should like to refer. In (1) the Ministry refers to the dropping of leaflets and other advertising matter, and then goes on to explain that for the purposes of the Victory Loan campaign the Secretary of State waived this provision. Now, we feel very strongly that this was quite wrong. If it is an offence against public safety to drop advertising matter from aircraft—and such a proceeding might easily lead to serious accidents in the streets—in one case, it is no less in another. If, for example, it be wrong to advertise FLIGHT in this manner, it is equally wrong to thus advertise a Government loan. More so, in fact, inasmuch as a Government Department should set an example rather than attempt to set itself above the law with the connivance of another Department. To our way of thinking, the methods adopted to advertise the recent loan were undignified in the extreme—to call them cheap would be to mix a metaphor, for they cost the nation a good round sum of money

## Flight—And the Men



"Flight" Copyright.

**Captain I. F. FAIRBAIRN-CRAWFORD**, General Manager of the Aeroplane and Airship Departments,  
Sir W. G. Armstrong, Whitworth and Co., Ltd., Newcastle-on-Tyne.

from which it received very little return. We trust that if and when another loan is issued, or when the Government desires to make a moving appeal to the people, it will at least not ask any Department to connive at the commission of acts which, within a month, have to be specially notified as being against the law. There is very little doubt that pilots have offended in the belief that the prohibition was a dead letter, owing to the example given them during the loan campaign. Let us have no more of it.

**The Future  
of the  
R.A.F.**

The Air Ministry has announced the conditions of permanent service of officers and men in the peace-time Royal Air Force. The announcement is rather belated, but in extenuation of the delay it should be pointed out that the R.A.F. is not quite in the same position as the Navy or the Army. Both of the latter Services were in being before the war and no creative work has had to be done in the establishment of their post-war strength. Whether they remain at the strength they were in 1914 or whether their numbers be reduced or increased is merely a matter of Government decision which can be carried out by the Admiralty and War Office Staffs with ease and celerity. In the case of the R.A.F., however, it was impossible to determine the constitution of the Staff before the strength of the new Force and the manner of its organisation had been determined. As everyone knows, there was no R.A.F. before the war and thus there was no administrative headquarters. All this has had to be created and has meant a large measure of delay in the announcement of ultimate details.

The full text of the official document stating the terms of service is published in another part of this issue of *FLIGHT*, so there is no need to refer to it in detail, except in a very general sort of way. It should be noted that, so far as the commissioned branches are concerned, it is proposed to feed these through a special R.A.F. college similar in constitution to Sandhurst and Osborne, which is to be opened in February next. The age for entry to this college has been set at 17½ and the youth who is admitted will, for the first year, receive what may be described as a general education, with a comparatively small amount of technical instruction. In the second year his instruction will be mainly technical, and provided he passes out at the end of that year, he will then be sent to join a squadron, in the same way that the Sandhurst cadet goes to join a regiment.

**Not a  
Blind Alley** There is one thing that should be emphasised, and that is that the young man who elects to take a commission in the R.A.F. is by no means entering a "blind alley" occupation. Even if he secures only a temporary

**Honours for Sir Hugh Trenchard**

It was announced on Wednesday that H.M. the King has been pleased to approve that the following honour be conferred upon the high officer of the Air Force mentioned below, in recognition of the great services rendered to the country during the war:—

Air Vice-Marshal Sir H. Trenchard, K.C.B., D.S.O.:  
Baronetcy.

In the House of Commons, on Tuesday, Mr. Lloyd George handed to the Speaker a message from the King signed by his own hand. The Speaker read the message as follows:—

"His Majesty, taking into consideration the eminent services rendered during the late war by those officers who

commission he need not fear that. Temporary commissions are to be for three or four years and at any time during that period an officer may be offered a permanent one. In the event of his being so offered a permanent commission, he will have secured a great deal of knowledge which will be of inestimable use to him in civil life. He can specialise in flying, engineering, designing, photography, wireless telegraphy and telephony, or mechanical transport. Thus at the end of his service he will find himself in possession of a degree of training in technical subjects far in advance of that which he would probably have had as a civilian student.

Service in the non-commissioned ranks is equally attractive. A young man of 18 may join up and be taught a trade and earn pocket money at the rate of a guinea a week while he is learning. At the same time he will receive clothing, lodging and food free and will thus have no expenses. If he shows particular aptitude, he can rise to the rank of sergeant-major, when he will receive pay at the rate of 18s. per day. (By the way, is it intended to retain these ranks copied from Army nomenclature or are they to be altered as those of the officers have been?)

The men it is particularly desired to attract are those with a knowledge, or a desire to learn, carpentry, or draughtsmen, coppersmiths, electricians, fitters, instrument makers, camera repairers, moulders, pattern-makers, turners and wireless operator mechanics. All boys entered and trained in the service, will be advanced to the rank of leading aircraftsmen at 5s. 6d. to 6s. 2d. per day on satisfactory completion of training, and the position just now is such that promotion to non-commissioned rank is certain to be extraordinarily rapid—and the commencing pay of a sergeant is 9s. 6d. per day.

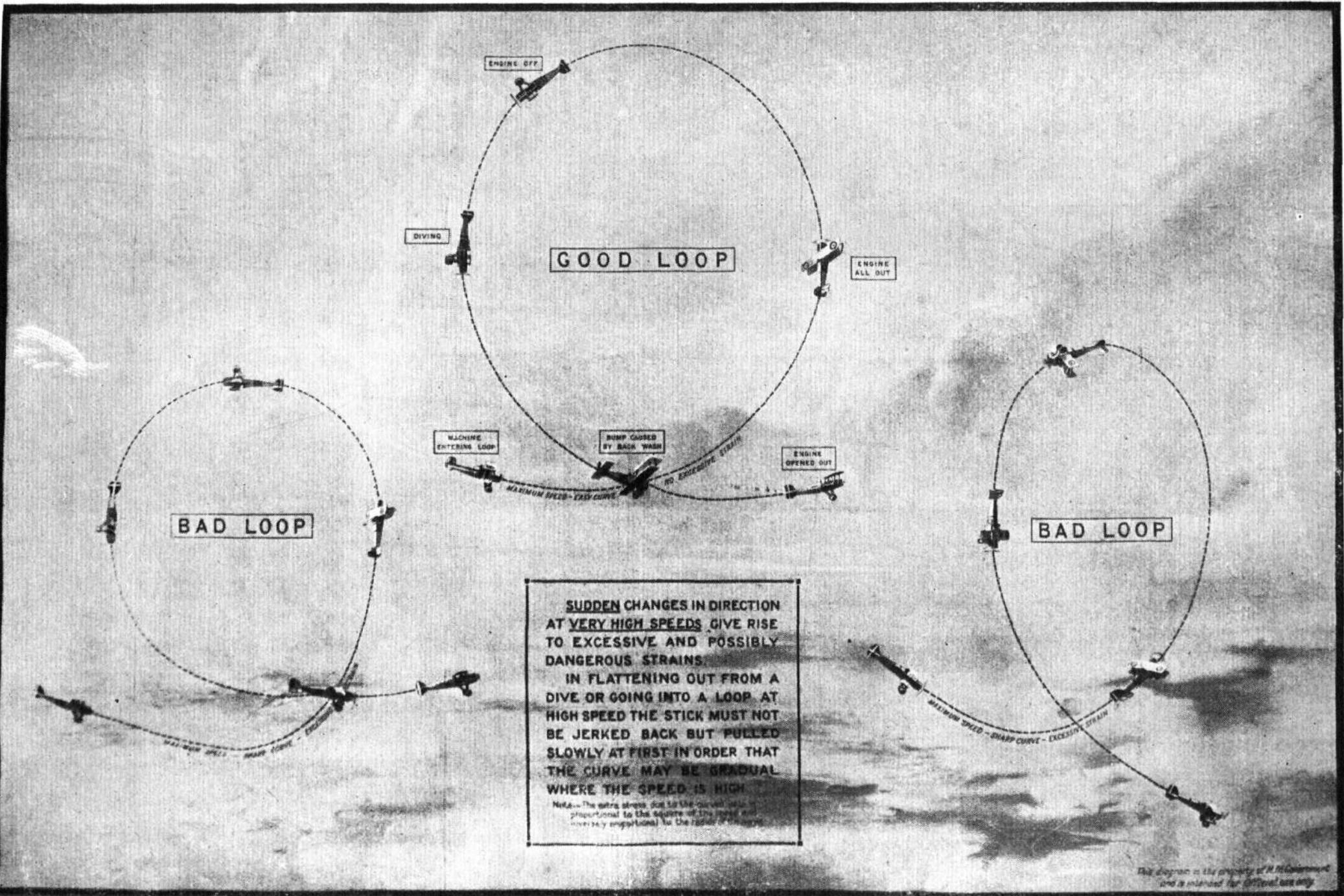
Men who have been working for civilian firms of aircraft constructors are, unfortunately, being discharged in large numbers, but there seems to be a great opportunity for many of them in the R.A.F. We shall certainly have to wait for the "boom" in civilian aviation for another year or more, and in the meantime the R.A.F. holds promise of being just the Service in which men who wish to keep in close touch with the industry will be able not only to keep up their standard of craftsmanship but to better it. Men who have served for three or four years should then be able to command high wages and from that point of view alone the R.A.F. is certainly a most attractive Service. Not the least advantageous point about the issue of the new terms of service is that the announcement clears up finally all the uncertainty which has been rife regarding the future of the Force and places it, once and for all, in the same position as the Navy and Army. In a word, it is now constituted as a permanent part of our standing defences, in which service for officers and men is as stable and certain as in either of the other two.

commanded and directed his forces by sea, on land, and in the air, and being desirous, in recognition of such services, to confer upon them some signal mark of his favour, recommends to his faithful Commons that he should be enabled to grant to:—

"Air Vice-Marshal Sir Hugh Trenchard: £10,000."

**The Air Ministry**

A PARLIAMENTARY paper, issued the other day, which gives the total number of persons on the staffs of the various Ministries, shows that whereas on November 11, 1918, the number engaged in the Air Ministry was 4,646, in March, 1919, it had diminished to 4,090.

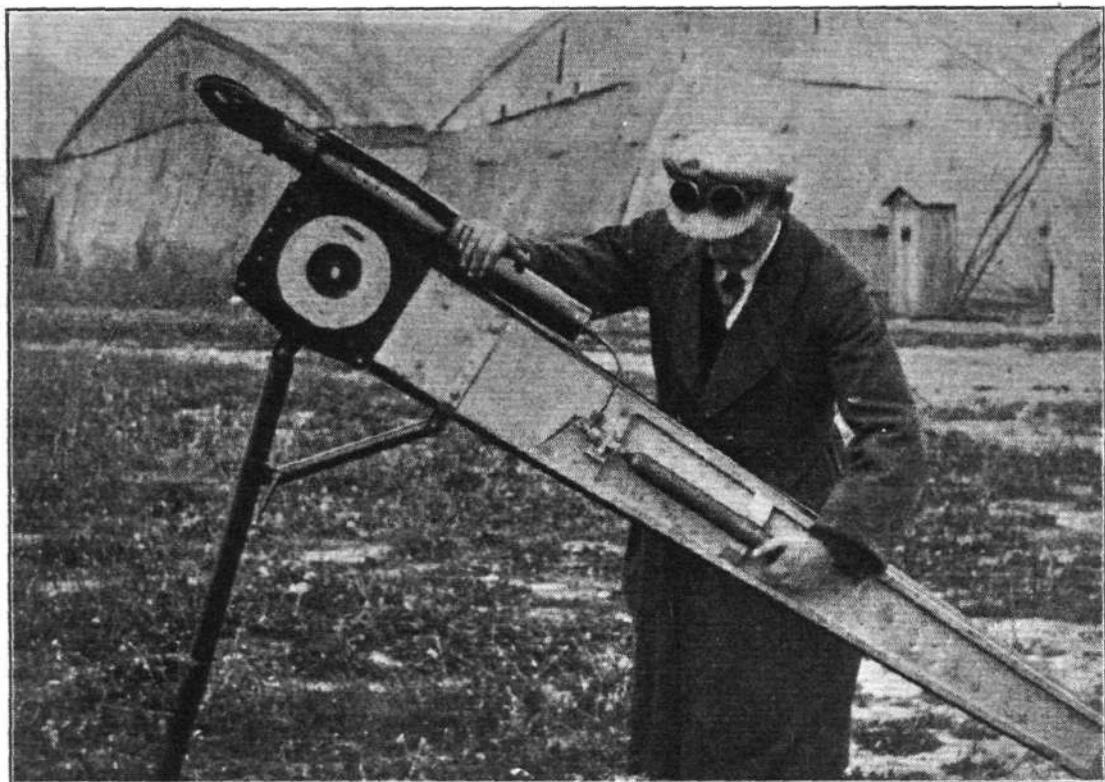


Good and Bad Looping. (Drawing published by the Air Technical Services for use at the R.A.F. Schools)

## A MECHANICAL "PROP-SWINGER," THE ODIER

THE primitive and not to say dangerous process of "swinging the prop" in starting-up an aero engine is one of the problems in aviation that has constantly received the attention of designers. Various types of self-starters which form a part of the power plant itself have been devised and used with more or less success, but the fact that these add considerably

Odier, and supplied by Messrs. The Borel Establishment, of 22 bis, Boulevard Bourdon, Neuilles s/s Paris, gets very near to solving the problem, for in the first case its weight is by no means excessive, thereby possessing a distinct advantage over other types when carried on the machine, and, secondly, when compared with other portable devices like

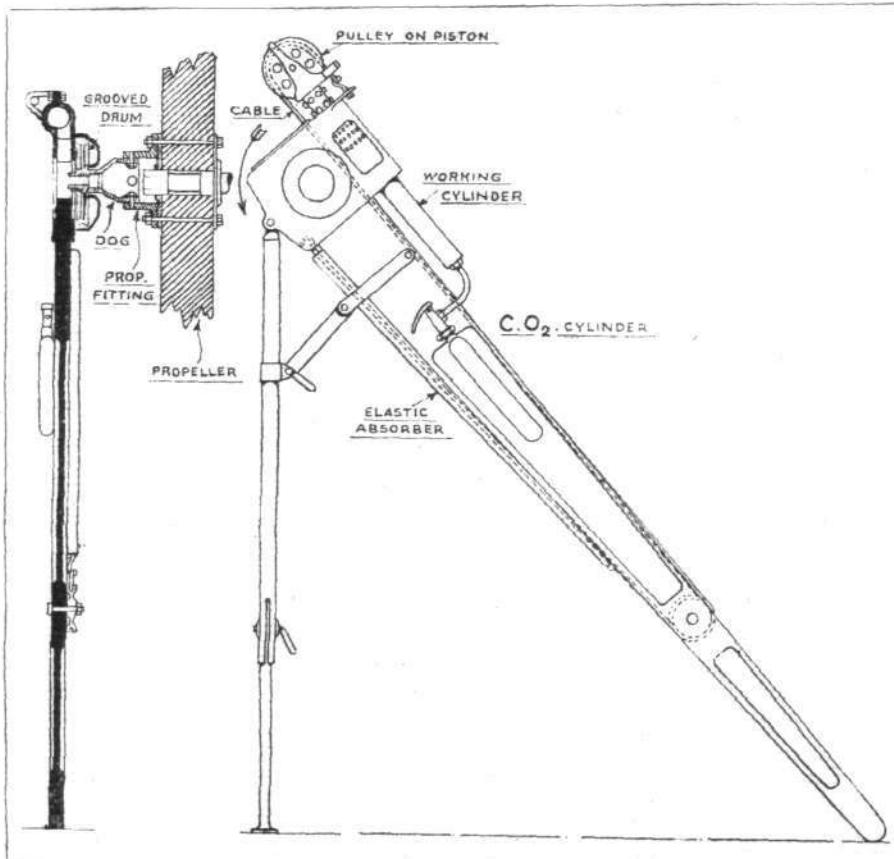


## The Odier portable aero-engine starter.

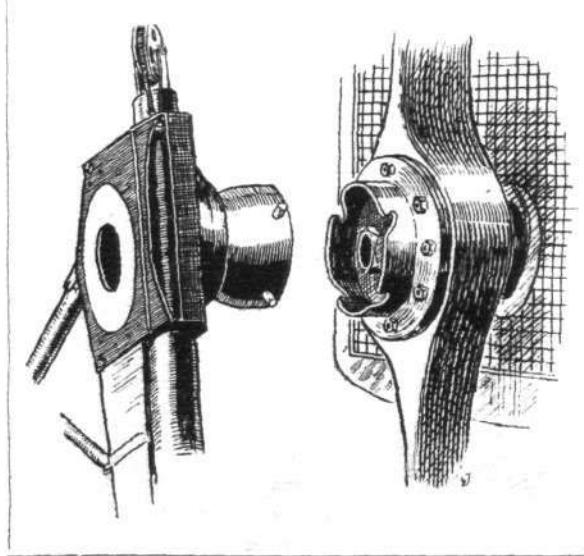
to the total weight of the machine—an extra weight that is useless during flight—rather detracts from their value. The starting-gear incorporated in, and driven by, a motor car or motor lorry evolved by the late B. C. Hucks, though excellent, is cumbersome and somewhat limited in action. It appears to us, therefore, that the device invented by M.

the Hucks, its compactness, low weight and safety in operation render it much more efficient.

Briefly, the Odier starter, which is shown in the accompanying illustrations, consists of a "bipod," carrying at its upper end a long steel cylinder and piston. Attached to the extremity of the piston, which projects outside the cylinder, is a pulley over which a cable is passed, having one end fastened to the cylinder and the other end wound four times round a grooved drum and then secured to an elastic absorber. The grooved drum is mounted on a short shaft having a bell-shaped extremity on which four projections are placed symmetrically around the periphery in such a way that they can be made to engage with sloping recesses in a standard fitting mounted on the boss of the propeller or tractor screw.



### General arrangement of the Odier portable aero-engine starter.



Sketch showing the driving coupling of the Odier portable aero-engine starter.

Mounted on the apparatus is a small tube or reservoir, containing liquid carbonic acid and connected up to the cylinder. The operation of starting-up is as follows:—The apparatus—which can be adjusted in height by means of the telescopic leg shown—is held so that, with the legs resting on the ground, the driving dog is brought into contact with the fitting on the air screw. On pressing a small lever, pressure from the CO<sub>2</sub> reservoir forces the piston outwards, thereby tightening the cable around the drum and causing the latter to make two sharp revolutions. The air screw is thus also rotated and the engine started, and through the angle given the recesses in the air screw fitting, the starter is pushed forward and disengaged. Should the engine backfire, neither the apparatus nor the operator are in any way injured, for as soon as the drum rotates in the opposite direction it brings the piston back, against the already expanded gas, when the cable becomes slack, leaving the drum free to rotate indefinitely.

The carbonic acid flasks are similar to those used for fire-extinguishers, flame-projectors, "Sparklets," etc., each flask being capable of giving five starts with a 300 h.p. Hispano-Suiza engine. Larger flasks are also supplied. Hundreds of these starters have been used on all types of engines, such as the 130 h.p. Clerget, 200 and 300 h.p. Hispano-Suiza, 400 h.p. Liberty, 350 h.p. Napier, Rolls-Royce, etc.

That this starter is easy and speedy in operation is proved by the fact that at a certain aerodrome an apprentice, 15 years old, started six machines in seven minutes. On another occasion a 400 h.p. twin-engined Borel-Odier postal seaplane had to make seven forced descents upon the water owing to a leak in the radiator. As it was very rough, starting by hand would have been out of the question, but fitted with the stationary type Odier starter—which is bolted on the crank-end, with operating controls situated inside the cockpit—fourteen successful starts were easily accomplished.



# The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

## Vice-Patron of the Club

H.R.H. THE PRINCE OF WALES has honoured the Club by becoming a Vice-Patron.

## Society of British Aircraft Constructors and Royal Aero Club

A Meeting of the Joint Standing Committee of the Society of British Aircraft Constructors and the Royal Aero Club was held on Thursday, July 24, 1919, when there were present:—Royal Aero Club: Lieut.-Col. J. T. C. Moore-Brabazon, M.P., in the Chair, Lieut.-Col. F. K. McClean, Lieut.-Col. Alec Ogilvie and Mr. Harold E. Perrin, Secretary. Society of British Aircraft Constructors: Mr. R. O. Cary, Mr. Hamilton Fulton, Mr. N. G. Gwynne and Mr. Charles V. Allen, Secretary.

**Chairman.**—On the motion of Mr. N. G. Gwynne, seconded by Lieut.-Col. F. K. McClean, Lieut.-Col. J. T. C. Moore-Brabazon, M.P., was unanimously elected to the Chair.

The appointment of the Joint Standing Committee was reported as follows:—

### Society of British Aircraft Constructors

Capt. P. D. Acland. Mr. Hamilton Fulton.  
Mr. R. O. Cary. Mr. N. G. Gwynne.

### Royal Aero Club

Lieut.-Col. F. K. McClean. Mr. J. H. Nicholson.  
Lieut.-Col. J. T. C. Moore- Brabazon, M.P. Lieut.-Col. Alec Ogilvie.

**Records.**—It was decided that the word "Record" should not be used in any advertisement except in the case of a definite record having been granted by the Royal Aero Club.

## SPECIAL COMMITTEE MEETING

A Special Meeting of The Committee was held on Wednesday, July 30, 1919, when there were present:—Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., in the Chair, Mr. Ernest C. Bucknall, Lieut.-Col. John D. Dunville, R.A.F., Lieut.-Col. Spenser D. A. Grey, D.S.O., R.A.F., Lieut.-Col. T. O'B. Hubbard, M.C., R.A.F., Lieut.-Col. F. K. McClean, Lieut.-Col. Alec Ogilvie, Col. C. R. Samson, D.S.O., R.A.F., and Mr. Harold E. Perrin, Secretary.

## A Deal in Aeroplanes

THE Aircraft Disposal Board have just sold 260 new Avro aeroplanes to Mr. S. W. Copley, of 1, Queen Victoria Street, E.C. 4. It is understood that this comprises the whole surplus stock of machines of this type which the Department possessed. The highest number of aeroplanes sold to a single purchaser previously by the Board was about 100.

## And Another in Engines.

ANOTHER big deal reported is that by which the United Aircraft Engineering Corporation of New York, through its London agents, the Canadian and General Trust, Ltd., have

## Golf

### Royal Air Force Club v. Royal Aero Club

A Golf Match between the Royal Air Force Club and the Royal Aero Club took place at Worplesdon on Tuesday, July 29, 1919. The morning's play resulted in the Royal Air Force Club being defeated by 6 points to 1. The afternoon was given up to four-ball matches, in which the teams finished "2 all." The Royal Aero Club won, therefore, on the day's play by 8 points to 3.

## THE FLYING SERVICES FUND

(Registered under the War Charities Act, 1916)

### Administered by the Royal Aero Club

For the benefit of Officers, Non-Commissioned Officers and Men of the ROYAL AIR FORCE who are incapacitated while on duty, and for the widows and dependants of those who are killed or die from injuries or illness contracted while on duty.

**Honorary Treasurer:**  
The Right Hon. LORD KINNAIRD.

**Committee:**  
H.R.H. PRINCE ALBERT, K.G. (Chairman).  
Mr. CHESTER FOX.  
Lieut.-Col. T. O'B. HUBBARD, M.C., R.A.F.  
Lieut.-Col. C. E. MAUDE, R.A.F.

**Secretary:**  
H. E. PERRIN.

**Bankers:**  
MESSRS. BARCLAYS BANK, LTD., 4, PALL MALL EAST,  
LONDON, S.W. 1.

**Subscriptions:** £ s. d.  
Total subscriptions received to July 29, 1919 .. 15,077 19 1  
Amount paid for a passenger flight with Mr. H. G. Hawker on May 31, 1919. Per the Sopwith Aviation and Engineering Co., Ltd. 42 0 0

Total, August 1, 1919 .. .. .. 15,119 19 1

**Offices:** THE ROYAL AERO CLUB,  
3, CLIFFORD STREET, LONDON, W. 1.  
H. E. PERRIN, Secretary.

bought from the Aircraft Disposal Department 700 aircraft engines and a large number of aeroplanes.

These are for export to Canada and the United States, to develop the commercial use of aircraft in both countries.

## A New Record Claim

A BRIEF message from New York claims that an American aviator has beaten the altitude record by climbing to 30,700 ft. It is stated that "the thermometer then recorded 25 deg. below zero, and the motor became chilled, forcing the aviator to descend."

The name of the aviator, the make of machine, and the place where it occurred are, however, unimportant details which were not worth reporting apparently.

# THE ROYAL AIR FORCE

## NEW TITLES IN THE R.A.F.

THE Secretary of the Air Ministry makes the following announcements:—

His Majesty the King has been pleased to assume the title of Chief of the Royal Air Force.

His Majesty, on the advice of the Secretary of State for War and Air, has approved of new titles for the commissioned ranks of the Royal Air Force. These are set out below, with their corresponding ranks in the Navy and the Army:—

AIR FORCE.	NAVY.	ARMY.
Marshal of the Air	Admiral of the Fleet	Field-Marshal
Air Chief-Marshal	Admiral	General
Air Marshal	Vice-Admiral	Lieut.-General
Air Vice-Marshal	Rear-Admiral	Major-General
Air Commodore	Commodore	Brig.-General
Group Captain	Captain	Colonel
Wing Commander	Commander	Lieut.-Colonel
Squadron Leader	Lieut.-Commander	Major
Flight Lieutenant	Lieutenant	Captain
Flying Officer (or Observer)	Sub-Lieutenant	Lieutenant
Pilot Officer	Midshipman	Sec. Lieutenant

The object is to preserve and to emphasise the principle of the independence and integrity of the Royal Air Force

as a separate service among the fighting services of the Crown. Hitherto the titles borne by officers of the Royal Air Force have been exclusively military in character, and as such they are not suited to a service which has not only to serve the special services of the Army, but also those of the Navy, and in addition has a strategic and tactical sphere of action independent of the other two fighting services.

It is, of course, not easy to command unanimous agreement on matters of nomenclature, but very long and careful consideration has been given to the choice of the titles now approved, and many interesting alternative suggestions have been rejected.

The scheme is framed on the principle (a) that the ranks should as far as possible correspond to actual functions; (b) that the ranks should as far as possible correspond to equivalent status in the three services; and (c) that there should be no repetitions in titles apart from the prefixes in the higher ranks. A distinction is preserved between the regimental officers and officers of general rank. Officers of general rank in the Royal Air Force are "Air Officers," and the expression "Air Officer" corresponds to the expression "General Officer" in the Army or "Flag Officer" in the Navy.

The new titles came into force on Monday.

## COMMISSIONS IN THE R.A.F. AND SERVICE IN THE R.A.F. RESERVE

THE Air Ministry makes the following announcement:—

It has been decided that officer personnel of the Royal Air Force will be provided for the present:—

1. By awarding a limited number of permanent commissions.
2. By granting 2,500 temporary commissions.

### Permanent Commissions

A list of officers who have been awarded permanent commissions appears in the *London Gazette* to-day (August 1), but there remain to be awarded a further number of officers selected from those now serving in Russia, those attached to the Department of Controller-General of Civil Aviation and to the Department of Director-General of Supply and Research, and in some special cases which are still under consideration. The question of the award of permanent commissions to officers serving with airships will be dealt with later.

A certain number of permanent commissions will also be awarded in about six months' time to selected applicants from among the officers who are then serving on the temporary commission list.

No officer on the permanent commission list has been awarded a commission in a rank higher than the substantive rank he held except second lieutenants who have been commissioned as lieutenants. The necessary adjustment will be made in promotion Gazettes at an early date.

Officers employed as stores officers will in future belong to the Quartermasters' Branch of the R.A.F., unless they take up a flying qualification, and permanent commissions are only offered to these officers on this understanding. They will come under the rate of pay of the Quartermaster Branch, but will meantime be permitted to draw the higher rates laid down in the new scheme of officers in the general list until the position of each individual officer has been settled.

The new rates of pay and allowances in the case of officers given permanent commissions will run from August 1, these officers for the present being paid through the same agents as now.

Officers who have hitherto held temporary commissions only are informed that the War gratuity issuable in their case will be on the scale for permanent officers as their War service will now reckon as pensionable.

Any officer accepting a permanent commission to which he has been gazetted must notify this fact to the Air Ministry (D. of P.) through his O.C. at the earliest possible date and in any case not later than:—

- (a) August 15 in the case of officers at home stations.
- (b) August 31 in the case of officers with the Fleet in home waters or with the Forces of occupation in France and Germany.
- (c) September 30 in all other cases.

### Temporary Commissions

The scheme of entry for temporary commissions is open:—

- (a) To officers still serving who have not been awarded permanent commissions; and
- (b) To demobilised officers.

It is not applicable to officers attached or lent from the other regular forces. Their terms of service in the R.A.F. will be dealt with separately.

As a general rule candidates must not be more than 25 years of age on application, and must have qualified as flying officers. A limited number of officers of other classifications may, however, be selected. In the case of these officers the age limitation will not be enforced.

Employment will be for a period of three years. On the completion of two years of this service officers may be permitted, if desirous, to extend their services to four years in all. After the period of three or four years' service on the active list, officers will pass into the reserve for a further period of four years' service. During the period of service on the active list an officer may be called upon to serve in any part of the world.

Any officer who at any time is found to be physically unfit for the duties of the R.A.F. may be gazetted to the Reserve or out of the Service.

Officers not desirous of completing their full period of service on the active list may, at the discretion of the Air Minister, be permitted to transfer to the Reserve at any time.

All candidates will be required to pass a medical examination as to their physical fitness before acceptance.

Any temporary commission granted under these conditions may be terminated at any time under the rules laid down in the Royal Warrant for pay and promotion of the Army.

Whilst on the active list officers entered under the above provisions will, for the purpose of rank and command, be on exactly the same basis as permanent officers of the R.A.F.

Officers will be eligible for promotion during their period of service, if qualified in all respects under such conditions as may be laid down for permanent officers.

Applications by officers already demobilised should be made on Form 168, which can be obtained on written application to Secretary, Air Ministry (P.O.S.), London, W.C. 2.

Applications will be received at any time prior to the termination of the Army of Occupation period, but all applicants will be informed without delay whether their application is accepted.

Officers on joining will be brought on to the rate of pay of their approved rank.

The rates of pay and allowances and conditions of issue will be those normally in force from time to time for permanent officers of the R.A.F.

Service under this scheme will not affect the amount or date of issue of any gratuity which may otherwise be issuable in respect of past service.

As from August 4, 1919, in the case of officers continuing to serve without a break from the war period, and as from the date of entry in other cases, officers will be eligible for a gratuity of £75 for each year's service and proportionally for broken periods. This gratuity will be payable to them on the completion of their period of service on the active list, *i.e.*, on passing into the Reserve.

An officer placed in the Reserve before the full period of his service on the active list is completed, either at his own request or for physical unfitness due to causes beyond his control, may be paid such gratuity as the Air Council may think fit, not exceeding the above scale.

Officers injured whilst on duty will be eligible for non-effective benefits under the same conditions as permanent officers. In any case in which a pension is awarded, however, the officer will not receive in addition the gratuity to which temporary service would have entitled him.

The widows and children, or other dependants of officers killed whilst on duty, will be eligible for the same pensions and allowances as would be applicable to the widows and children or dependants of permanent officers of the R.A.F.

Officers will be required to provide themselves with the uniform of their rank. No outfit allowance will be payable to officers entered under this scheme unless they are subsequently directed to adopt a different pattern of uniform from that at present in force.

#### General

Officers of the flying, technical, and administrative branches (including Staff Officers) who :—

- (a) Are not on the selected list for permanent commissions;
- (b) Are not serving in Russia or with the Controller-General of Civil Aviation, and the Director-General of Supply and Research; and
- (c) Have not applied for temporary commission or for re-seconding in the case of officers belonging to the other regular services

will be regarded as eligible for demobilisation as soon as their services can be spared.

Officers desirous of consideration under (c) should send in their names through G.O.C. of Area, or direct to the Secretary, Air Ministry, if unattached. Applications will be considered as they are received.

Officers of the Regular Forces may be re-seconded without prejudice to their subsequent return to their parent service.

While a small proportion of officers in the permanent commission list are not flying officers, and while some temporary commission may also be awarded to officers who are not flying officers, the Air Ministry desires to point out that all officers given commissions who are not flying officers will, with the exception of certain technical officers, be required to qualify as pilots within 12 months from August 1, 1919, the policy and intention being that in future all commissioned service, except Quartermaster's service, within the Air Force will be undertaken by flying officers only. This is the reason why "flying risk" pay has been abolished.

Special regulations will be issued shortly governing the pension rights of officers holding temporary commissions in the R.A.F. who had served as commissioned warrant officers, warrant officers and ratings on regular engagements in the Royal Navy, or as warrant officers, N.C.O.'s, and men on regular engagements in the Army, including those who had been given commissions in the Army.

#### R.A.F. Reserve

An R.A.F. Reserve will be constituted, consisting of three classes :—

- (a) For flying officers.
- (b) For certain technical officers.
- (c) For General Service duties.

The following conditions of service in the Reserve are applicable only to officers entered under the special regulations for temporary commissioned service. Full Reserve Regulations will be published shortly.

Those in classes (a) and (b) require to keep up-to-date in the latest development, and periodical re-qualifying courses are, therefore, necessary.

Flying officers entered under the foregoing conditions for temporary commissioned service will, on completing their

period of service on the active list, be placed in Class A. of the Reserve for a period of four years. They may be permitted subsequently to re-enrol in this Class up to the age of 30 if of the rank of captain or below, 35 if of the rank of major, and 40 if of the rank of lieutenant-colonel.

Officers will hold the substantive rank which they held at the end of their active service period. They will be required to present themselves at the nearest R.A.F. training station not less than two days in each quarter, and to carry out not less than 12 hours' flying per annum on up-to-date war type machines. They will receive the full pay and allowances of their rank for each day upon which training is carried out, subject to the limitation that no officer will be allowed pay more than six days in any one quarter or 24 days in a whole year. In cases of accidents or injuries during such training, they will be eligible for non-effective benefits under the same conditions as permanent officers.

A retaining fee of £30 will be paid on the completion of each year's service in Class A. of the Reserve, provided that certificates are produced showing that the necessary flying and attendance have been carried out. This retaining fee will be held to cover all contingent expenses for upkeep, wear and tear of uniform, etc. The customary travelling expenses will be allowed in addition for each occasion of training.

Any officer who for special reasons is unable to carry out his training in any quarter is to report the reasons in full for the approval of the Air Ministry. Except under exceptional circumstances no officers will be allowed to omit two consecutive quarters' training.

Officers unable for any cause to complete their full period of flying service in Reserve Class A. may be permitted to transfer to Class B. or Class C. of the Reserve if considered suitable.

The object of Class B. of the Reserve is to provide technical officers on mobilisation for the following branches :—

- (a) Engine and rigging.
- (b) W/T and signals.
- (c) Photography.
- (d) Armament.

The officers of Class B. of the Reserve will, in the immediate future, be drawn from the following sources :—

(a) By the voluntary enrolment of a limited number of those who have served in one of the above technical branches during the War.

(b) By officers who transfer from Class A. of the Reserve either on completion of their service in that Class or when they have been permitted to retire before completion of such service.

(c) From officers of the permanent list permitted to retire.

Officers who have completed four years' service in Class A. of the Reserve may, if below the rank of captain, be advanced to that rank on joining Class B. Enrolment in Class B. will be for periods of four years, which may be extended up to the age of 40.

Officers in Class B. will be required to undergo a technical course lasting for 14 days in each year at the R.A.F. technical school for their particular branch, and will be expected to pass a medium standard re-qualifying examination at the conclusion of the course.

Subject to satisfactory compliance with the provisions outlined in the preceding paragraph officers will receive the full pay and allowances of their rank for the period of annual training together with an annual retaining fee of £20. This retaining fee is held to cover the incidental expense of upkeep of uniform, etc. They will also be allowed the customary travelling expenses for each occasion of travelling.

In cases of accidents or injuries during training, officers will be eligible for non-effective benefits under the same conditions as permanent officers.

Any officer who for special reasons is unable to carry out his period of annual training is required to report the reasons, for the decision of the Air Ministry.

Class C. of the Reserve is intended to provide officers on mobilisation for various duties not requiring up-to-date technical knowledge or skill.

Service in Class C. of the Reserve will be entirely voluntary. There will be no annual qualifying courses and no retaining fee. The age limit will be 50.

## AIR FORCE CADET COLLEGE

THE Air Ministry announces that a Royal Air Force Cadet College for the training of the permanently commissioned officers of the Royal Air Force will be opened next February.

The place where the college is to be established will be an-

nounced shortly. The number of cadets to be admitted on the opening of the college will be 55.

Admission will be by competitive examination. The Air Council fully considered the alternative of admission by nomination combined with a qualifying literary examination.

but decided to adopt for the present the system now in force for the entry of cadets to the Royal Military Academy, the Royal Military College, and cadetships in the Royal Navy (special entry), in order to secure an early entry and to make the training of the future officers of the Royal Air Force begin at the earliest possible moment. This decision does not prejudice future modifications in the system of entry designed to substitute nomination for a competitive examination, should experience show such a course to be desirable.

Candidates may compete for one or more of the above colleges and cadetships alternatively at the same examination. The subjects in the case of the R.A.F. Cadet College will be as follows:—

**OBLIGATORY.**—1, English; 2, English history and geography; 3, mathematics A (elementary); 4, one of the following languages: French, German, Italian, Spanish, Russian, Arabic, Hindustani.

**OPTIONAL.**—1, Latin; 2, Greek; 3, any one of the seven languages mentioned above other than that taken as an obligatory subject; 4, mathematics B (intermediate); 5, mathematics C (higher); 6, science (physics and chemistry); 7, elementary engineering.

All obligatory subjects must be taken up and not more than three of the optional subjects. Each subject will carry

2,000 marks. In addition, candidates may take up freehand drawing, to which 400 marks will be allotted. The syllabus in each subject will be that now in force for the other colleges and cadetships mentioned above. Candidates will be required to qualify—i.e., to obtain not less than 33 per cent. of the total marks allotted—in each of the obligatory subjects. Provided a candidate qualifies the total of marks gained in all the subjects taken up will determine his place on the list.

The examination will be held in November. Candidates must have attained the age of 17½ and must not have attained the age of 19 on January 1, 1920, to be eligible to compete. Candidates will be required to pass a medical examination which will be conducted at or about the time of the competitive examination.

The course at the college will last two years. During the second year of the course candidates will be taught to fly.

The regulations governing the entry of King's cadets, honorary King's cadets, and candidates specially nominated by the Air Council will be similar to those now in force in the case of the Royal Military Academy and the Royal Military College. Detailed regulations for admission and for the course at the college will be issued shortly, and will include full information as regards fees and allowances.

## WARRANT OFFICERS, NON-COMMISSIONED OFFICERS AND AIRMEN. NEW RATES OF PAY AND PENSION

1. THE rates of pay and pension for the ranks of the Royal Air Force below commissioned rank have been under review, and the standard rates now authorised are as shown in the accompanying statements.

2. The rates of pay will come into force on August 1, for all men not dispensed before that date, in substitution for existing rates and bonus, but in any case where the present rates of pay, together with Army of Occupation bonus, are more beneficial than the new standard rates, a vested right to the old rates will be allowed as follows:—

(a) Men on regular engagements may draw their present rates plus bonus, if more beneficial than the new rates, up to March 31, 1920.

This will include men now serving who may, without a breach in their service, re-engage or sign regular engagements.

### (b) New Enlistments

All men enlisting on or after August 1, 1919, whether with previous service or not, will come on the new rates of pay forthwith.

### (c) Men Serving for Occupation Period.

These men, if not on regular engagements, retain the old rates plus bonus until discharge, if more favourable.

3. Rates of pay for the Medical and Schoolmaster Branches will be subsequently announced.

4. Badges for good conduct will be granted, under regulations to be promulgated, after 3, 8 and 13 years' service. Each badge will carry pay of 3d. a day up to a maximum of 9d.

5. The present rates of separation allowance will be continued under existing conditions as to entitlement until December 31, 1919, when the rates and conditions of issue will be again reviewed. This will not, of course, affect the position of men serving for the period of occupation or those who have extended their service for two, three or four years with reserved rights to this allowance.

6. A further announcement will be made as to allowance (other than separation allowance).

7. Further details as to rates and the conditions of their issue will be published in regulations in due course.

### ROYAL AIR FORCE. (Other ranks).

The rates of pay proposed are as follows:—

#### TECHNICAL—GROUP I.

		s. d.	Over 3 years.	Over 6 years.
			s. d.	s. d.
Sergeant-major, Class I	..	14 0	rising by 1s. a day a year to 18s.	—
Sergeant-major, Class II	..	13 0	—	—
Flight-sergeant	..	11 6	12 0	12 6
Sergeant	..	9 6	10 0	10 6
Corporal	..	7 9	8 0	8 6
Leading aircraftman	..	5 6	5 10	6 2
Aircraftman I.	..	4 6	4 10	—
Aircraftman II.	..	4 0	—	—
Boy	..	1 6	—	—

Applicable to the following trades and occupations:—

Blacksmith.	Fitter (constructional).
Carpenter (boat builder).	Fitter (drivers petrol steam).
Carpenter (motor body builder).	Fitter (motor boat).
Carpenter (propeller maker).	Fitter (armourers).
Carpenter (rigger).	Fitter (motor boat coxswain).
Coppersmith (I)	Fitter (millwright).
Draughtsman (normally boys only).	Fitter (jig and tool maker).
Electricians (compass setter and repairer).	Instrument maker and camera repairer.
Fitters and subsidiary combined trades.	Moulders.
Fitter (aero engine).	Pattern maker.
Fitter (M.T.)	Turner (2).
(1) Not to be promoted beyond sergeant unless qualified as both coppersmith and tinsmith.	Wireless operator (mechanic).

(2) Not to be promoted beyond the rank of Flight-sergeant unless qualified as both machinist and turner.

All boys (trained in the Service) will be advanced to leading aircraftman on satisfactory completion of training.

#### TECHNICAL—GROUP II.

		s. d.	Over 3 years.	Over 6 years.
			s. d.	s. d.
Sergeant-major, Class I	..	12 6	—	rising by 6d. a day a year to 15s.
Sergeant-major, Class II	..	11 6	—	—
Flight-sergeant	..	10 0	10 6	11 0
Sergeant	..	8 6	9 0	9 6
Corporal	..	6 8	7 0	7 4
Leading aircraftman	..	5 2	5 6	5 10
Aircraftman I.	..	4 6	4 9	—
Aircraftman II.	..	3 9	—	—
Boy	..	1 6	—	—

Applicable to the following trades and occupations:—

Acetylene welder.	Coach painter.
Balloon basket maker.	Photographer.
Camera repairer.	Rigger (aero).
Electrician.	Rigger (airship).
Machinist.	Sheet metal worker.
Carpenter.	Tinsmith.

Wireless operator.

#### TECHNICAL—GROUP III.

		s. d.	Over 3 years.	Over 6 years.
			s. d.	s. d.
Sergeant-major, Class I.	..	11 0	—	rising by 6d. a day a year to 15s.
Sergeant-major, Class II.	..	10 0	—	—
Flight-sergeant	..	8 6	9 0	9 6
Sergeant	..	7 0	7 6	8 0
Corporal	..	5 10	6 2	6 6
Leading aircraftman	..	4 6	4 10	5 2
Aircraftman I.	..	4 0	4 4	—
Aircraftman II.	..	3 6	—	—
Boy	..	1 6	—	—

Applicable to the following trades and occupations:—

Driver (petrol) (3).	*Shoemaker.
Motor boat coxswain.	*Tailor.
Driver (steam).	*Musician.
Driver (winch).	Hydrogen worker.
Motor cyclist (1).	Vulcaniser.
Cook and butcher.	Motor boat crew (2).

\* So long as present conditions of free repair continue permanent bands only.

Stoker (not to be promoted beyond corporal).

(1) Not to be promoted beyond Corporal unless qualified as driver (M.T.).

(2) See under non-substantive pay, etc., as to hard lying money.

(3) Not to be promoted beyond sergeant unless qualified as fitter.

## ADMINISTRATIVE—GROUP IV

	Over 3 years. Over 6 years.		
	s. d.	s. d.	s. d.
Sergeant-major, Class I.	11 0	Rising by 6d. a day a year to 15s.	
Sergeant-major, Class II.	10 0	9 0	9 6
Flight-sergeant	8 6	7 6	8 0
Sergeant	7 0	6 2	6 6
Corporal	5 10	4 10	5 2
Leading aircraftman	4 6	4 4	
Aircraftman I.	4 0	—	—
Aircraftman II.	3 6	—	—
Boy	1 6	—	—

Applicable to the following occupations:—

Clerk (general).	Clerk (stores).
Clerk (pay).	Clerk (Q.).

Meteorologist.

## NON-TECHNICAL—GROUP V

	Over 3 years. Over 6 years.		
	s. d.	s. d.	s. d.
Sergeant-major, Class I.	10 0	—	—
Sergeant-major, Class II.	9 0	—	—
Flight-sergeant	8 0	8 6	9 0
Sergeant	6 6	7 0	7 6
Corporal	5 0	5 4	5 8
Leading aircraftman	4 0	4 4	4 8
Aircraftman I.	3 4	3 8	—
Aircraftman II.	3 0	—	—
Boy	1 6	—	—

Applicable to the following trades and occupations:—

Batman.	
Aircraft hand	{ (G.),
	{ (P.T.I.)
	{ (G.I.).

See under "Non-substantive pay," etc., as to addition to substantive pay for the performance of specific duties.

## Non-substantive Rates of Pay, etc.

	s. d.
Gunnery instructor	1 0
Physical training instructor	—
1st Class	1 0
2nd Class	0 8
Aerial gunner	0 6*
Interpreter	—
Schoolmaster (to men not of Schoolmaster Branch).	Naval rates, 1s. per hour, with a maximum of 5s. a day; days of employment only.
Crew pay	Coxswain 4s., other members of crew 2s. a day continuously whilst borne on the establishment of a squadron for service in aircraft.

\* In addition to crew pay of 2s. per day whilst employed on the authorised establishment of a squadron.



## Roll of Honour

PUBLISHED AUGUST 4

Previously reported Missing, now reported Killed  
 Tucker, Sec. Lieut. D. C., R.F.C.  
 Webb, Capt. N. W., M.C., R.F.C.

## Accidentally Killed

Annis, Lieut. W. F., Cent. Ont. Regt., attd. R.A.F.  
 Munro, Lieut. J. W., N.S. Regt., attd. R.A.F.

## Died

Ferguson, Lieut. J. F., Can. Rly. Troops, attd. R.A.F.  
 Price, Lieut. J. W., Can. Art., attd. R.A.F.

## The Seabird Flies to Spain

LEAVING its aerodrome at Acton at 7 a.m. on July 31, "The Seabird," the aeroplane constructed to fly the Atlantic by the Alliance Aeroplane Co., flew to Madrid, making the journey of nearly 900 miles in 7½ hours. Capt. W. R. Curtice was the pilot, Mr. J. A. Peters, the designer of the machine, was observer. The machine, which is fitted with a 450 h.p. Napier Aero engine, carried only 350 gallons of petrol, although the full capacity is 500 gallons. "The Seabird" carried a gold cup for presentation to the Queen of Spain as a memento of the occasion, also a letter from Princess Beatrice to her Majesty, as well as a parcel of newspapers.

## R 34 Over London

ON her way from Pulham to her station at East Fortune on July 31, the R 34 made a detour to pay a surprise visit to London. She left Pulham at 5 p.m., and arrived over the Metropolis just before 7 p.m. At a low altitude she came from the east to Westminster, circled over the Houses of Parliament, and went off in an easterly direction. She reached East Fortune at 6.5 a.m. the next morning.

## From Norway to Denmark

THE British flying-boat, F 5-4044, which as noted in our last issue, recently flew from Dundee to Norway, arrived in Copenhagen on July 29. She left Christiania the previous day but slight engine trouble necessitated a stop at Horten. She made a re-start at 11 the next morning and alighted at the naval flying station near the Danish capital at 2.15 p.m. On Sunday the machine flew to Stockholm.

Hard lying money .. . . . To be paid at Naval rates and under Naval conditions to the Marine Branch of Royal Air Force.

GOOD CONDUCT PAY.  
 As for the Army.

## PENSIONS

1. The minimum qualifying period will be 24 years from the date of attestation at the age of 16½ years.

2. The numbers allowed from time to time to re-engage for pension will be determined by the requirements of the service and will in any case be restricted to men who have reached N.C.O. rank.

3. The pension will be granted on the basis of a daily rate for each complete year of service in each rank, with proportionate amounts for completed months. The daily rate will be uniform for all branches.

The daily rate for ranks other than warrant officers is as follows:—

	d.
Aircraftman	1 ½
Corporal	2
Sergeant	2 ½
Flight-sergeant	3

4. *Warrant Officers.* The scale for warrant officers will remain as at present, namely:—

For each completed year prior to warrant rank, £3.

For each year as warrant officer:—

(a) If retired as warrant officer, Class II, £4.  
 (b) If retired as warrant officer, Class I, £5.

The above scale is subject to maxima rates as follows:—

Warrant officers, Class II .. . . . £120

Warrant officers, Class I .. . . . £150

5. All men discharged to pension will thereupon become members of the R.A.F. Reserve.

6. If after 24 years' service a man continue to serve, he will draw the pay of his rank and his time will count for increased pension.

7. *Commutation.*—Commutation of pension will be allowed where it would be a distinct and permanent advantage to the pensioner, always provided that a minimum of 2s. a day is left uncommuted.



## An Aerodrome for Hull.

A COMMITTEE of Hull Corporation has met Lieut.-Col. Beatty, of the Air Ministry, for the purpose of investigating, on the spot, proposals for a new aerodrome at Hull. Col. Beatty stated that it seemed to be fairly certain that Scandinavian and Dutch traffic would come to Hull.

## Sheffield to London by Air

A NUMBER of officials connected with Messrs. Vickers, Ltd., who were required in London on July 29, were brought from Sheffield by aeroplane. Leaving Sheffield at 3.20 p.m., they flew to Hounslow, and were taken to the centre of London by motor car, arriving at their destination at 5.50 p.m. The party included Colonel J. H. Leslie, a director of Messrs. Vickers; Miss Joan Leslie, Mr. R. G. Blake, Maj. J. Wortley, Maj. E. W. Wilkinson, Capt. F. H. Wilkinson, Capt. H. G. Howson, Capt. H. R. Vickers, Mr. F. D. Wild, and Maj. A. J. Gainsford. The machine also carried a pilot and two mechanics.

The aeroplane used was a Vickers-Vimy passenger-carrying commercial machine, which is of similar construction to the aeroplane which flew the Atlantic. It has two Rolls-Royce "Eagle" mark engines.

## Aerial Mails in India

"A DETAILED scheme for an inland aerial postal service in India is being considered by the Government of India," says Mr. H. G. Perry, the *Daily Express* correspondent at Bombay. "A beginning will be made very shortly with a Bombay-Karachi seaplane service, in which the Governor of Bombay is taking a very lively interest. A service will probably be in full swing early next year. It will link up Delhi, Simla, Bombay, Calcutta, Karachi, Poona, Lahore and Madras. I understand that the Government has definitely decided on a State service."

## Over the Andes

ON July 30 the Italian "ace," Lieut. Antonio Locatelli, crossed the Andes from Mendoza to Valparaiso, having taken 2 hrs. and 5 mins. to fly the 156 miles. The maximum altitude reached was 20,000 ft. Lieut. Locatelli started from Buenos Aires on July 23, but had to stop at Mendoza owing to bad weather over the mountains.

# SOME DEVELOPMENTS IN AIRCRAFT DESIGN AND APPLICATION DURING THE WAR

By the Right Hon. LORD WEIR OF EASTWOOD, P.C., Honorary Fellow of the N.E. Coast Institution of Engineers and Shipbuilders.

(Concluded from page 1016)

### PART III.—*Progress in Engine Design*

BEFORE 1914 it may be said that aero engine design had merely reached the stage of sufficient reduction of weight-power ratio to enable aeroplanes to fly. Beyond this, practically no special adaptation to aeroplane requirements had been attempted. The development of the aerial arm in the War, however, speedily emphasised the importance of other factors. The extension of the range of operations and the losses of machines, due to engine failure, raised insistent demands for greater reliability, whilst the necessity for easier maintenance called for engines of greater all-round accessibility.

The rapid progress of flying skill and the adoption of aerial acrobatics in fighting created a demand for engines of short length and quick controllability.

The desirability of carrying out reconnaissance untroubled by enemy attack or anti-aircraft fire focussed attention on the necessity of increasing the ceiling or maximum height of operation. Coping with this most important requirement again produced an improvement of the weight power ratio, and the ceiling of approximately 7,000 ft. in 1914 was increased to nearly 30,000 ft. by the beginning of 1919. It must be remembered also that the diminished density at great height decreases the amount of oxygen taken into the engine, and therefore, the power which the engine can deliver. At 15,000 ft., for instance, a 300 h.p. engine can only deliver about 200 h.p.

The extension of bombing activities at long ranges emphasised the importance of the study of the fuel consumption which, for a flight of six hours, amounts to a large weight per horse-power. The question of the thermal efficiency had, therefore, to be studied in conjunction with the weight/power ratio, so that engine speeds increased whilst the aerodynamic requirements of the machine demanded reduced propeller speeds.

Long before the end of the War the power requirements of some aeroplanes and seaplanes had far outstripped the possibilities of any one engine, so that machines possessing two, three, four, or even more engines were in service or being built.

An important factor affecting aero engine development is the time which is required to produce a new design. Generally about eighteen months would have to elapse between the commencement of the design and a useful flow of reliable production engines. During most of this period no useful practical experience can be obtained as to the qualities or defects of the new design, and by the time bulk experience of its behaviour in service is available, it is necessary to supersede it by another more advanced type. Less than half the time is required for the development and trial of an aeroplane design, so that the aeroplane is generally well ahead of the engine for which it is designed.

In 1914 our aircraft engine position was by no means satisfactory, and we depended for a large proportion of our supplies on other countries, principally on France, whose Gnome and Renault engines were pre-eminent. Great efforts were immediately made to extend our sources of design and supply, and by the end of the War British engines had gained foremost place in design, and were well up to requirements as regards supply.

Many of the earlier designs were considerably influenced by previous automobile engine practice, but a wide divergence of design and detail soon took place due to the entirely different nature of the conditions to be faced. In automobile practice silence and good carburation over a wide variation of speeds and loads were the most important features, whereas those points are of small importance for an aircraft engine. The task of the aero engine designer was still further complicated by the fact that the order of importance of the various features of the engine is different according to the class of machine for which the engine is being designed. Certain entirely novel conditions had to be met and their attendant difficulties overcome. For example, an aero engine must have the ability to function in practically any position and, for a time at least, when completely inverted. This requirement has had a far-reaching effect on the lubrication system of aero engines, as it practically precludes the carrying of oil in the crankcase.

The shape of the engine is a matter requiring careful

consideration for aircraft, as head-resistance, accessibility and small moment of inertia are all features of considerable importance dependant on the shape. The wide ranges of temperature and pressure through which an aeroplane may pass affect the carburation, the cooling system, the lubrication system, and even the ignition to a very serious degree. An aeroplane may undergo a very rapid change of as much as 75 deg. F. in temperature, combined with the maximum difference in moisture content of the air. With water-cooled engines, therefore, it has been found necessary to put a thermometer in the circuit and fit the radiator with blinds operated by the pilot, and even with such accessories the maintenance of the water at a constant temperature has often been a matter of great difficulty, and has thrown a heavy responsibility upon the pilot. At the same time evaporation losses must be reduced to a minimum, as the amount of water lost on long journeys is an important feature, so much so that it is true to say that the Atlantic could not be flown to-day with any of the water-cooling systems that were deemed sufficient at the outbreak of War.

The intense vibration due to the conditions of high speed and lack of rigid support under which aero engines must work impose new and sever conditions mechanically on every part. The violent and varying slip stream from the propeller also imposes a new problem as regards carburettor intake conditions, where again the seriousness of fire risk has to be taken into account and avoided. Probably no detail of the whole engine process has received more expert and prolonged attention than the ignition, and much of the increased reliability and efficiency of the modern engine undoubtedly results from this work.

The very severe centrifugal and inertia effects which are experienced in aerial fighting, coupled with the necessity under such conditions of immediate response to the throttle, have necessitated careful design of the petrol supply system to ensure a constant and adequate supply of fuel.

In addition, the length and ramifications of the fuel system have increased considerably with the growth in the size of machines and in the number of engines. Fig. 39 shows a typical lay-out of petrol system for a large modern multi-engined machine. The main tanks are numbered 1, 2, 3, 4, 5 and 6, and have a combined capacity of 1,800 gallons of petrol. These six tanks feed by gravity to the main collector which is situated in the engineer's cabin. In each of the pipes between the collector and tanks is fitted a non-return

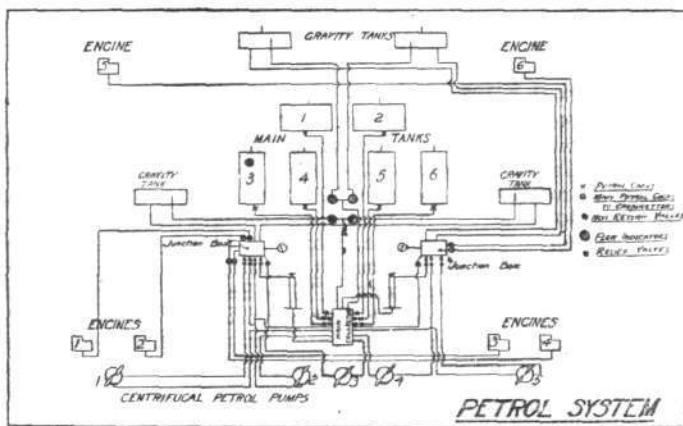


Fig. 39.

valve to obviate any possibility of the petrol running from the top tanks into the bottom, as these six tanks are not all on the same level.

From this collecting box the petrol is lifted by five centrifugal pumps, which are shown below, into the junction boxes, which feed the engines. These centrifugal petrol pumps are driven by airscrews which are placed in the slip stream of the propellers in order that the petrol shall be pumped up whilst the machine is stationary. If these pumps should fail to act the petrol can still be lifted to the junction boxes by the hand pumps shown one on each side just above the collector.

The two distributors or junction boxes feed the engines;

that on the left feeding the four bottom engines, whilst the other supplies the two top engines. As the petrol supplied to these distributors is more than that used by the engines,

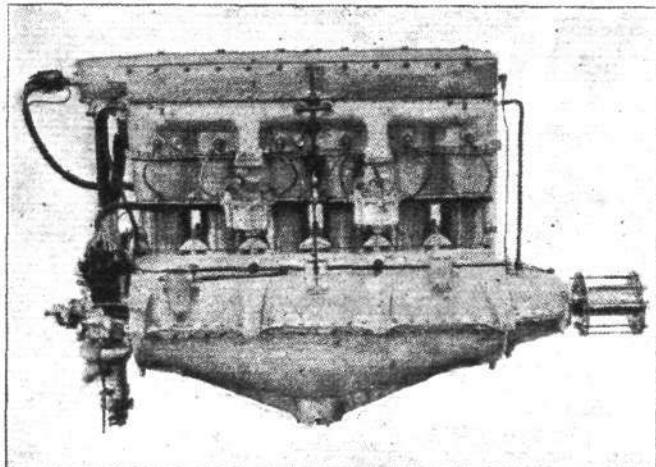


Fig. 40.—230 "Puma" (Siddeley).

the extra amount passes up to four small gravity tanks which will be seen in the illustration, and which are situated in the planes. These hold about 15 gallons each. As the excess of petrol continues the gravity tanks overflow through return pipes into the main collector. In these pipes flow indicators are fitted in order that the engineer may see that the system is properly working. After the main tanks are empty and no more petrol is supplied to the distributors, the petrol flows from the gravity tanks into the junction boxes, which ensure a further 60 gallons. The two junction boxes are fitted with indicators to show the pressure or head of petrol supplied. They are also fitted with relief valves discharging back into the collector. The collector is also fitted with a large filter, through which all the petrol passes on its way to the engine.

A great deal of progress has been achieved in the general arrangement of the engine and its cylinders so that the most effective use is made of all the material. With cylinders in line the deadweight loss per horse-power will rapidly decrease after the first cylinder, but after about four cylinders the economy to be gained by adding more cylinders practically ceases owing to the increased size of crankshaft and bearings required to resist torsion. This naturally leads to grouping the cylinders in two rows in V form working on a common crankshaft with two connecting-rods to each crank pin. Many such engines have been made with two rows of either

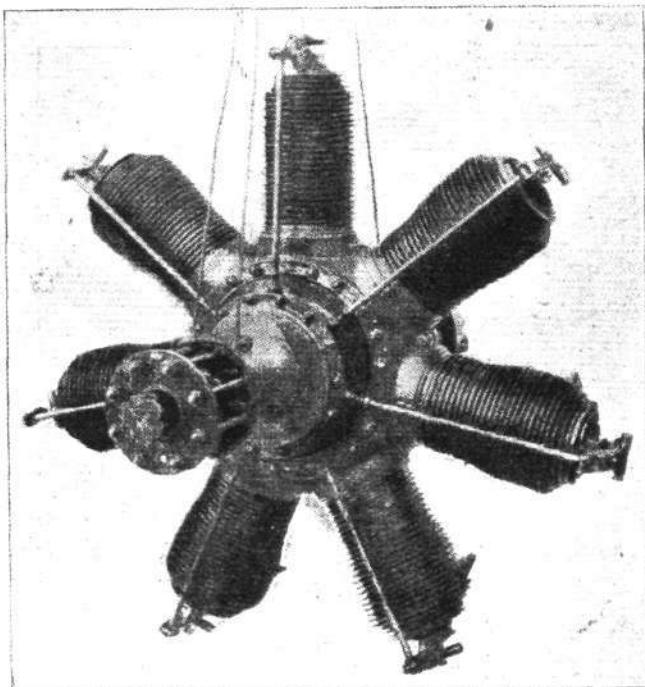


Fig. 41.—80 Gnome.

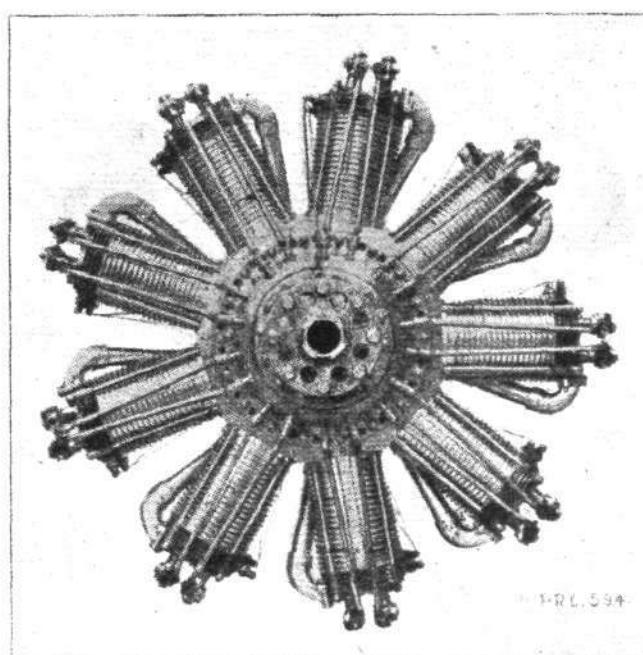


Fig. 42.—Bentley rotary.

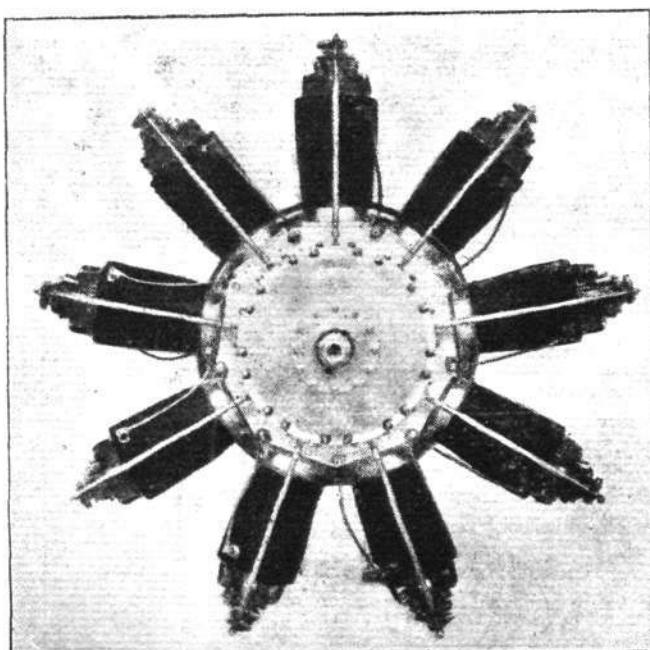


Fig. 43.—A.B.C. Dragonfly.

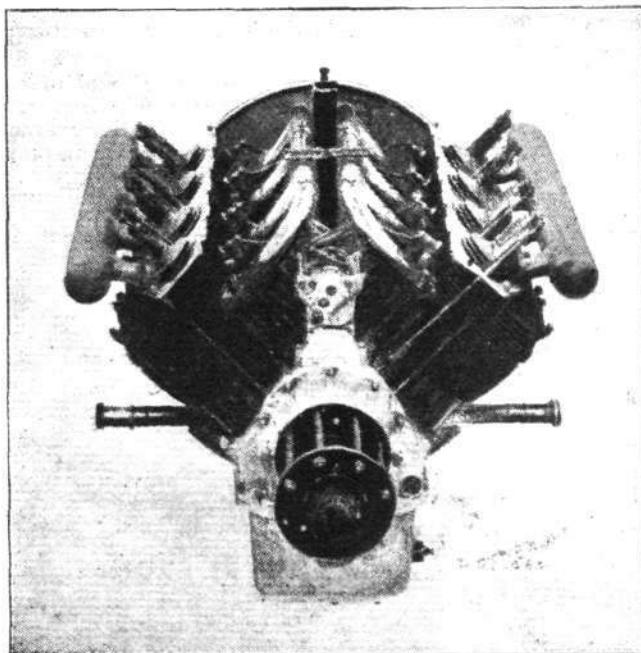


Fig. 44.—80 Renault.

four or six cylinders each. Further extension of this principle has enabled Messrs. Napier to produce a 12-cylinder engine.

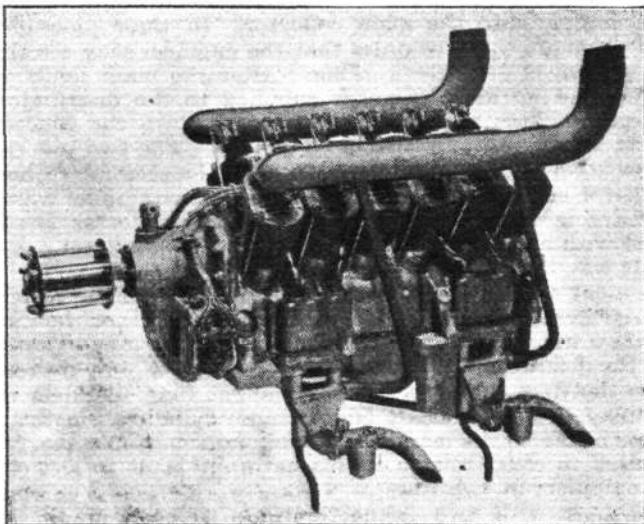


Fig. 45.—140 R.A.F. 4a.

shaft and crankcase is, of course, reduced to a minimum, and there have been engines with three, five, six, seven, nine, ten, and fourteen cylinders in one or two planes. Of this type the Cosmos Co. have produced a 450 h.p. 9-cylinder air-cooled radial engine which weighs only 1.47 lbs. per horse-

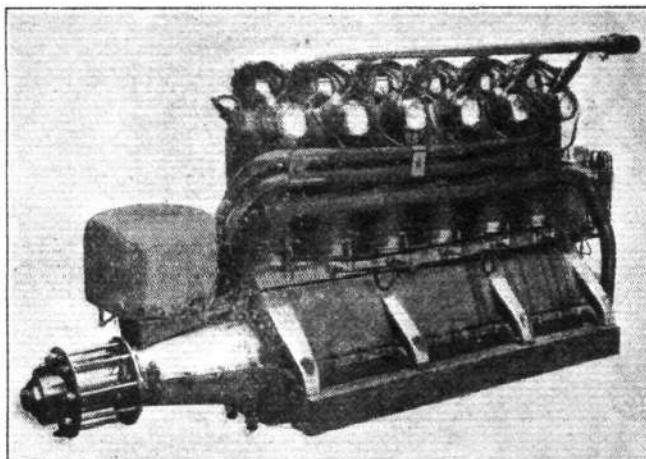


Fig. 46.—160 Beardmore.

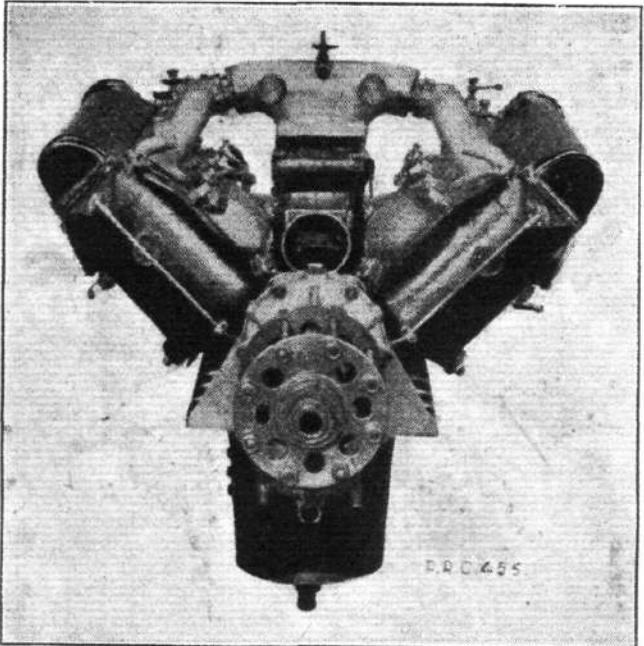


Fig. 47.—Hispano-Suiza.

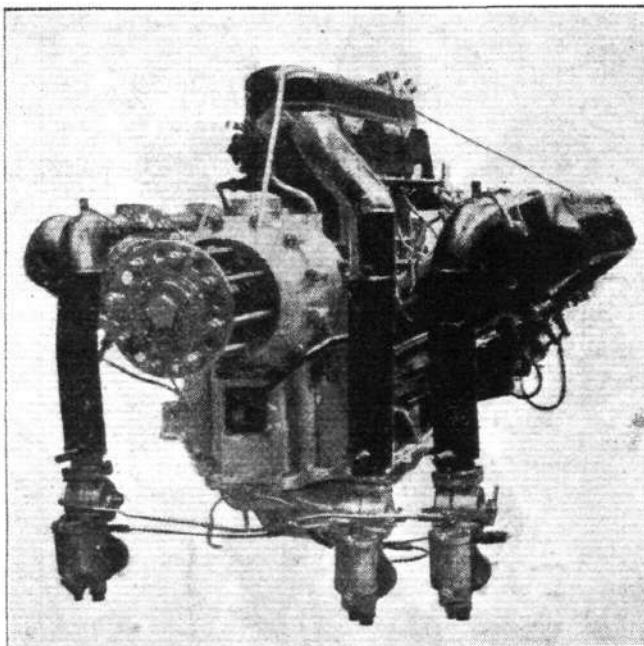


Fig. 48.—Napier Lion.

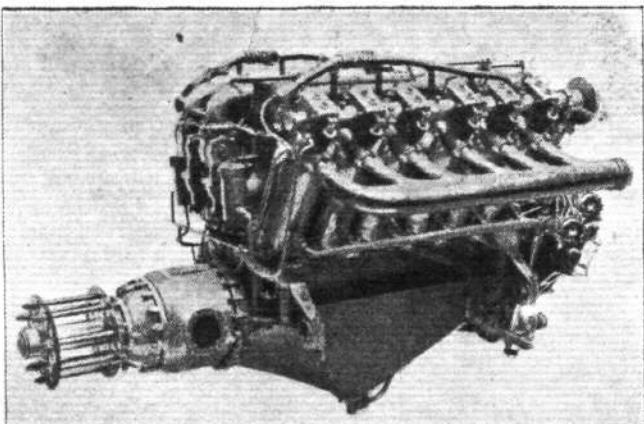


Fig. 49.—350 Rolls-Royce Eagle VIII.

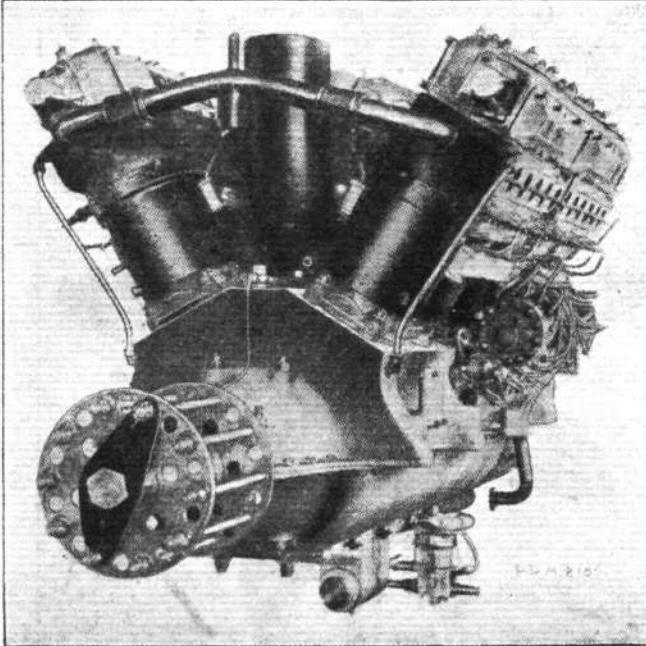


Fig. 50.—550 Galloway Atlantic.

power, or less than one-third the weights of similar type French engines of 1914-15.

Radial engines include those of the rotary air-cooled type, and progress in this type can be best indicated by taking the French 80 h.p. Gnome of 3·26 lbs. per b.h.p., and comparing it with the British Bentley engine of 230 h.p. weighing only 2·165 lbs. per h.p., a reduction of about 30 per cent., in spite of the tremendous increase in the centrifugal load. With radial engines of large size, however, the increased head resistance is a serious objection, and it is not likely that this method of arrangement can be extended indefinitely as regards size.

A saving in weight and great improvement in mechanical efficiency have been obtained by eliminating the valve tappet rods and substituting overhead camshafts operating directly on the valves. Further economies have been effected by the employment of aluminium for the cylinders fitted with either steel or cast-iron liners. Pistons are now universally made of aluminium, and the gain in mechanical efficiency has been of even greater importance than the saving of weight. Hundreds of other details have also been the subject of most exhaustive study and improvement.

The question naturally arises, how is it that such results have been obtained in such a short time and in face of so many difficulties with regard to labour and material. In the first place, the result has been obtained by the free use of money; the question of expense could naturally not be allowed to stand in the way of progress in this all-important matter. Money has been spent on research, on steels and other materials, processes of manufacture, inspection organisations, etc., and the amount of scrapping of material and parts not up to standard has been on a scale that no commercial firm could adopt and live. The greatest credit is due to the steel manufacturers for the manner in which they collaborated with the Government on the evolution of special steels and the preparation of standardised specifications.

The table below gives the principal particulars of some of the leading engines of to-day.

#### PART IV.—Navigation and Meteorology

Although great strides have been made during the last year in the development of scientific navigation, the weather still remains the dominating factor in all flying operations.

During the War the whole of our aerial work was controlled by weather conditions, although in the later phases a vast amount of successful operations were carried out in weather which, before the War, would have been considered far too bad to allow of any flying at all. The problem of flying in anything like a thick fog or ground mist remains unsolved, and if flying in this country is to be a real commercial proposition much solid research in this direction will be necessary.

When the War started navigation was dependent mainly on map reading. Our machines were fitted with compasses, but these were of indifferent design, and could not be relied on unless the course could be frequently checked by a direct view of the ground below. The design of an aeroplane compass presents special problems, and the errors involved in using a compass of the type used on ships had not been realised before the War. These problems were successfully investigated by the late Keith Lucas, who evolved a satisfactory aeroplane compass. This compass and subsequent types based on its design were standardised. Even with the improved compass, navigation in unfavourable weather conditions still presents great difficulties.

The very great advantages, especially in long distance bombing operations, of being able to fly for considerable distances through clouds were clearly realised, and a special research was undertaken to make this a practical proposition. Excellent results were obtained, chiefly due to the introduction of an instrument called the Turn Indicator. When flying in a cloud or a fog-bank the pilot loses all sense of direction, but this instrument used in conjunction with the compass enables him to steer a straight course, even in these circumstances.

At the time of the signing of the Armistice we were training pilots in large numbers in the use of these instruments, and there is no doubt that the Germans would have had some unpleasant surprises a few months afterwards, when formations of bombing aeroplanes would have suddenly emerged from the clouds over their objectives when the inhabitants below might reasonably have considered themselves safe. Before any attempt could be made to attack them our aeroplanes would have been back in the clouds again and on their way home.

Navigation by dead reckoning is, of course, dependent on meteorological observations and for us, therefore, a good meteorological service was a *sine qua non*. It must be remembered that on the Western Front we had always this important disadvantage, that the prevailing wind was blowing from West to East, thus tending to drift our aeroplanes away from our lines and reduce their chances of getting back when in difficulty. In spite of this the vast majority of air fighting took place well on the German side of the lines, and, even allowing for the German raids over England, the amount of reconnaissance and bombing we carried out over German occupied territory was far greater than that attempted by them on our side of the line. Although, of course, the credit for this is mainly due to the magnificent spirit of our personnel, the effectiveness of our meteorological service had some effect in establishing our ascendancy.

A few words may be added about the use of directional wireless for navigation. The Germans used this method for directing their Zeppelins in the raid over England, but the system they used involved the sending out of frequent signals

Particulars of Representative British Aero Engines of Each Type. May, 1919

Type.	Method of Cooling.	No. of Cylinders.	(Bore (mm.).	Stroke (mm.).	Compression Ratio—to 1.	Piston Speed (ft. per min.).	b.h.p.		Speed.		m.e.p.		Normal Propeller Speed.	Dry Weight in lbs.	lbs. per h.p.	Petrol lbs. per Normal h.p. Hour.	Oil lbs. per Normal h.p. Hour.	
							Normal.	Max.	Normal r.p.m.	Max. r.p.m.	Normal.	Max.						
Bentley, rotary 2	Air ..	9	140	180	5·26	1,536	230	234	1,300	1,360	92	—	1,300	498	2·165	—	·63	·088
A.B.C., fixed radial, Dragonfly	Air ..	9	139·7	165·09	4·42	1,787·5	320	350	1,650	1,750	110	—	1,650	635	1·98	—	·585	·028
Straight six, Siddeley, Puma ..	Water	6	145	190	5	1,558	250	266	1,400	1,500	115	123	1,400	645	2·58	—	·6	·062
2 rows of 4 V. at 90°, Sunbeam, "Arab" ..	Water	8	120	130	5·3	1,707	212	220	2,000	2,100	112	—	1,200	550	2·6	3·24	·486	·039
2 rows of 6 V. at 60°, Rolls-Royce, Eagle 8 ..	Water	12	114·29	165·09	5·3	1,950	359	368	1,800	1,900	127·2	131·4	1,080	926	2·58	3·23	·5	·025
2 rows of 6 V. at 60°, Galloway, "Atlantic" ..	Water	12	145	190	5·4	1,872	550	575	1,500	1,600	126·3	—	1,500	1,150	2·09	2·74	·504	·045
2 rows of 6 V. at 60°, Rolls-Royce, "Condor" ..	Water	12	139·69	190·5	5·1	2,187·5	610	656	1,750	2,000	129	129·4	971	1,350	2·21	2·86	·495	·0225
3 rows of 4 V. at 60°, Napier, "Lion" ..	Water	12	139·69	130·17	5·55	1,708	450	468	2,000	2,100	122	126	840	1,318	1·86	2·51	·495	·0225

from the airship to be picked up by the German wireless stations. The latter would then send out signals to the airship indicating its exact position. This system had the great disadvantage that we also could pick up the airship's signals and thus locate its position. So we always knew where they were coming from, and arranged our defence accordingly. Our own system was for the aircraft to carry the directional coils, and by picking up signals from home stations, to locate its own position. Our apparatus was only perfected late in the War, but we counted on using it effectively in the projected raids over Berlin, to which I have already referred. With further research and development there are good prospects that directional wireless will be of the greatest value in the long distance navigation of commercial aircraft in the future.

*Future Developments.*—Any reference to the future of aviation must necessarily be very brief and purely general in character. The rapid and quite abnormal growth in the technique and application of aircraft under the stress and artificial conditions of War-time must now give place to the more sober rate of development of peace-time.

Our peace-time Royal Air Force, as I visualise it, will become a relatively small organisation of remarkable efficiency with the highest ideals and with the keenest *esprit de corps*. Its matériel should represent the last word in technical progress such as can only be achieved by considerable expenditure. Quality must be the keynote of its policy not only in matériel but also in personnel.

An outbreak of war must see us with the very best designs of engine and aircraft, tried and tested, and with a manufacturing nucleus on which war production may be readily expanded.

In regard to civil aviation, one is naturally unhappy at the necessity of adopting the prophetic rôle, but one factor is clear and definite. Our Government must accept the heritage of war experience, and by action, support, and sympathy, encourage and develop its translation into the new channels of peace requirements.

The more immediate problems of international and domestic aerial legislation have now been provisionally solved by the International Aerial Convention and by the Civil Aviation Act, and it is very gratifying that in both these directions Great Britain has taken the lead and shown the way.

In another direction much remains to be carried out quickly. Our great mercantile marine in all its technical perfection would avail but little without our harbours, docks, lighthouses, charts, and navigational instruments. We possess fleets of aircraft of reliability and of great performance possibility, but our navigational facilities are still almost non-existent, and herein lies one of the main fields of action of our new Department of Civil Aviation.

In all considerations for the future of civil aviation, the two qualities of outstanding merit appertainable to the new form of transport are speed and independence of action as against land transport requiring roads or rails. These constitute the only assets for any commercial future. Speed in transport is associated with high cost, and speed will always command a high value. Early action should be taken in regard to a few main routes, especially in countries with equable weather conditions, and especially in new countries backward in rail development. Two such main routes would be Egypt to India, and Egypt to South Africa.

Another early development with immediate possibilities will be the use of large flying-boats for inter-island and coastal traffic, for example, in the West Indies and New Zealand. The independence of the flying-boat in regard to costly aerodromes, and its higher degree of safety in regard to landing-places is a factor of great immediate importance. The Government and the large existing transport companies, shipowners, and railways might well collaborate in their early efforts, as the initial financial results will not be healthy enough for entirely new enterprises.

Another aspect must not be neglected—the encouragement of the sporting and popular use of aircraft—and it would appear essential that the great number of War aeroplanes surplus to Air Force needs should be distributed at a low price and as early as possible to the many small enterprises and even to individuals so that the community at large may have their present enthusiasm and interest in aviation maintained and encouraged.

In technical development of design our Air Ministry must spend money by development contracts, as private enterprise will not be able to support the developments for some considerable time. This applies in particular to engine development. Attention should also be devoted to improvements in landing-carriages and landing problems, also the reduction in fire risks.

In conclusion, it would appear that the future rate of development will depend almost entirely on the permissible rate of expenditure and on the efficiency of the outlays.

I have to express my regret that lack of time has prevented

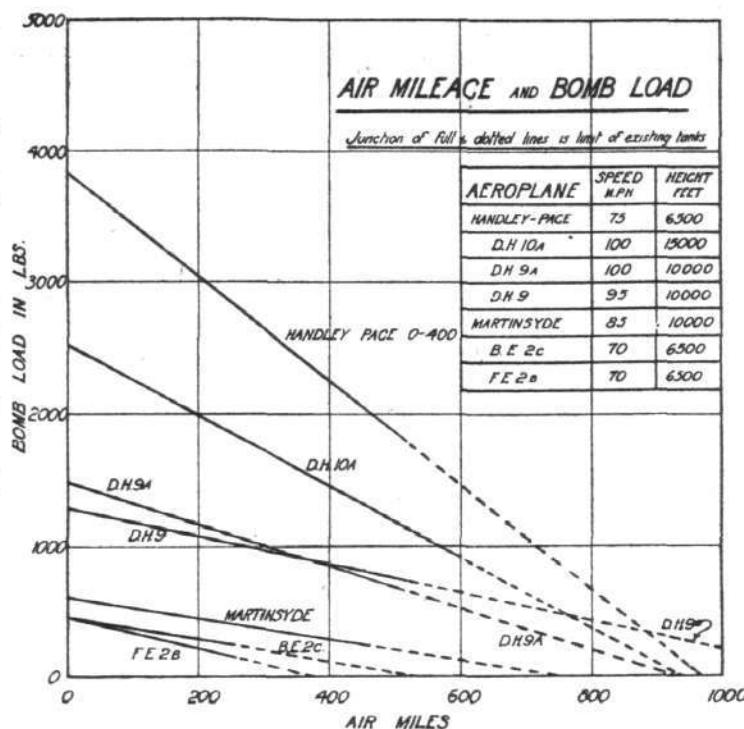


Fig. 51.

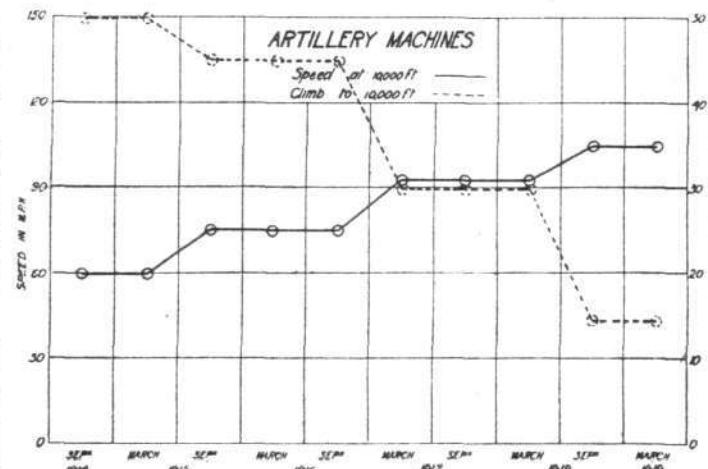


Fig. 52.—Performance increase.

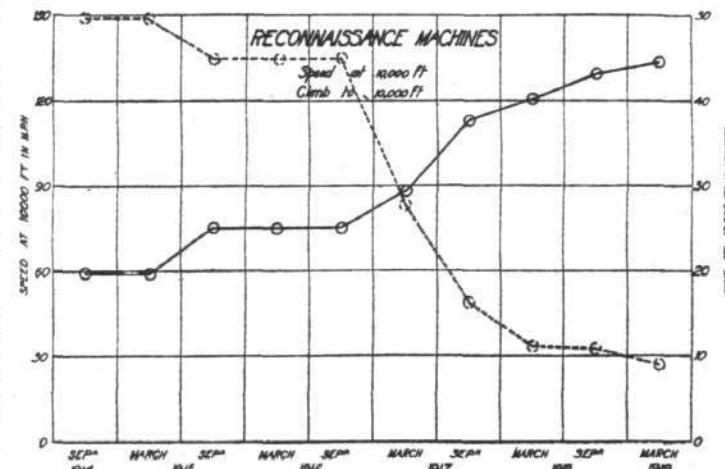


Fig. 53.—Performance increase.

this paper from becoming more than a series of somewhat disconnected notes, but it is hoped that these may prove to record some of the more outstanding factors in one of the many great wonders of the World War.

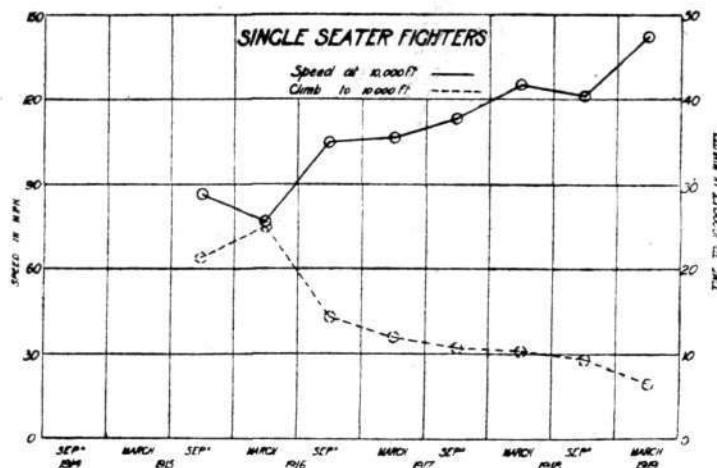


Fig. 54.—Performance increase.

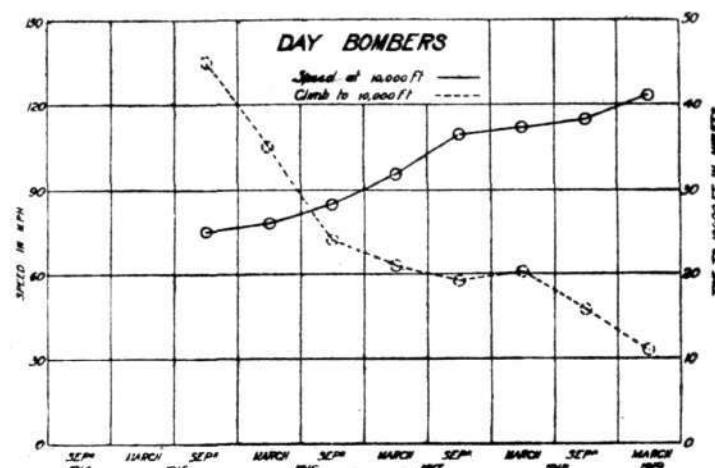


Fig. 56.—Performance increase.

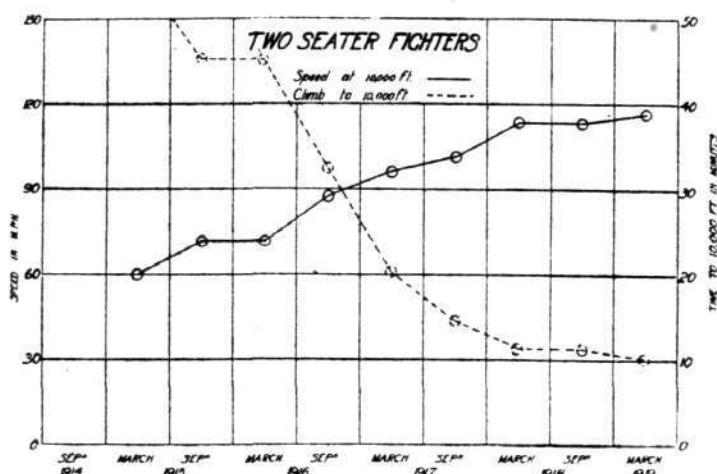


Fig. 55.—Performance increase.

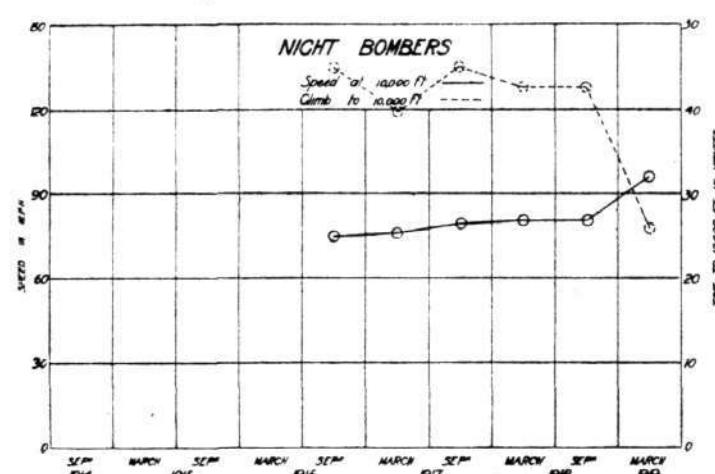


Fig. 57.—Performance increase.

I have to express my deep debt of gratitude to Lieut.-Col. Ogilvie and his partners, Messrs. Bristow, Pippard, and Watts, for their invaluable assistance in the preparation of the paper, also to Gen. Seely, Under-Secretary of State for



#### Fatal Accidents

WHEN leaving Cranwell aerodrome for Liverpool on July 31, a machine, piloted by Sec. Lieut. W. A. Roberts, during a steep bank, side-slipped and crashed to the ground. The pilot and passenger, Sec. Lieut. E. Ireland, were killed.

A verdict of "Accidental Death" was returned at the inquest on Lieut. Lupinsky, a Russian flying officer, who, on July 26, was struck by a propeller and killed on the Doncaster aerodrome when preparing to return to Tadcaster.

#### Triple Fatality at Hendon

ON July 18 Lieut. R. C. Cain, D.F.C., Corp. J. Gammie, 1st Aircraftsman H. T. Griffiths, were killed at Hendon. They had started off on a D.H. 10, and when the machine was turning, at a height of 150 ft., it dived to the earth. The accident was ascribed to an error of judgment on the part of the pilot, and the jury returned a verdict of "Accidental Death."

#### The Lost N.S. 11

ON July 28 a body was washed up at Salthouse, on the Norfolk coast, and later identified as that of Sergt. C. H. Lewry, the second coxswain of the wrecked airship N.S. 11. At the inquest at Cromer, no fresh evidence was forthcoming as to the cause of the disaster, and the coroner's verdict was "Found dead on the beach after being washed ashore from the wrecked airship."

#### British Officer Killed in Italy

A BRITISH aeroplane, described as Caproni F 304, proceeding from London, via Marseilles to Egypt, fell into the sea off the coast of Italy, about a mile from Monterosso, near Cape Mesco, on the evening of July 26, apparently owing to motor trouble.

Lieuts. Adams and Collings, and Sergts. Ascolis and Banour, were on board, and, with the exception of Lieut. Collinge, were able to free themselves from the machine and kept afloat. Unfortunately, the pilot, Lieut. Collinge, was fastened in the machine, and though he was eventually released by the efforts of his companions, he was greatly exhausted, and, despite all assistance, expired soon after being taken ashore.

Air, for permission to use the photographs of the different machines, and finally to the different aeronautical contractors for permission to use the photographs of the different machines.



#### The Caproni Disaster

So far no definite information has been received as to the cause of the crash of Caproni machine at Verona on August 2, but from stories of eye-witnesses something went wrong with the wings, which appeared to flutter and then to collapse. Several of the passengers jumped, but everyone on board was killed. It is believed that the total number of persons on board was 14, including two pilots, Lieut. Luigi Ridolfi and Lieut. Marco Resnati; five prominent journalists, Sig. O. Cipriani, T. Zangheri, Bruni, Bisi and Morgagni, and seven mechanics from the Caproni works. The machine, a large biplane, was fitted with three 200 h.p. motors. It left the Taliedo aerodrome, near Milan, at 7.30 a.m., and landed at Venice at 9.22. The return journey was started at 5 p.m., and when the disaster occurred the machine was flying over the Verona aerodrome at a height of 3,000 ft.

#### Memorials to Vedrines

A COMMITTEE has been formed in Paris to erect memorials to Vedrines at Villacoublay and at St. Rambert-d'Albon, where he met his death. It is also proposed to raise a fund for the benefit of Vedrines' children.

#### Kronstadt Bombed

WORD comes from Helsingfors that eight British aeroplanes flew over Kronstadt at 3.15 a.m. on July 30 and bombed the forts. All the batteries replied, the firing lasting 40 minutes. At 8.15 a.m. two more aeroplanes flew over the fortress and also met with a hot reception.

#### Large German Aeroplane Seized

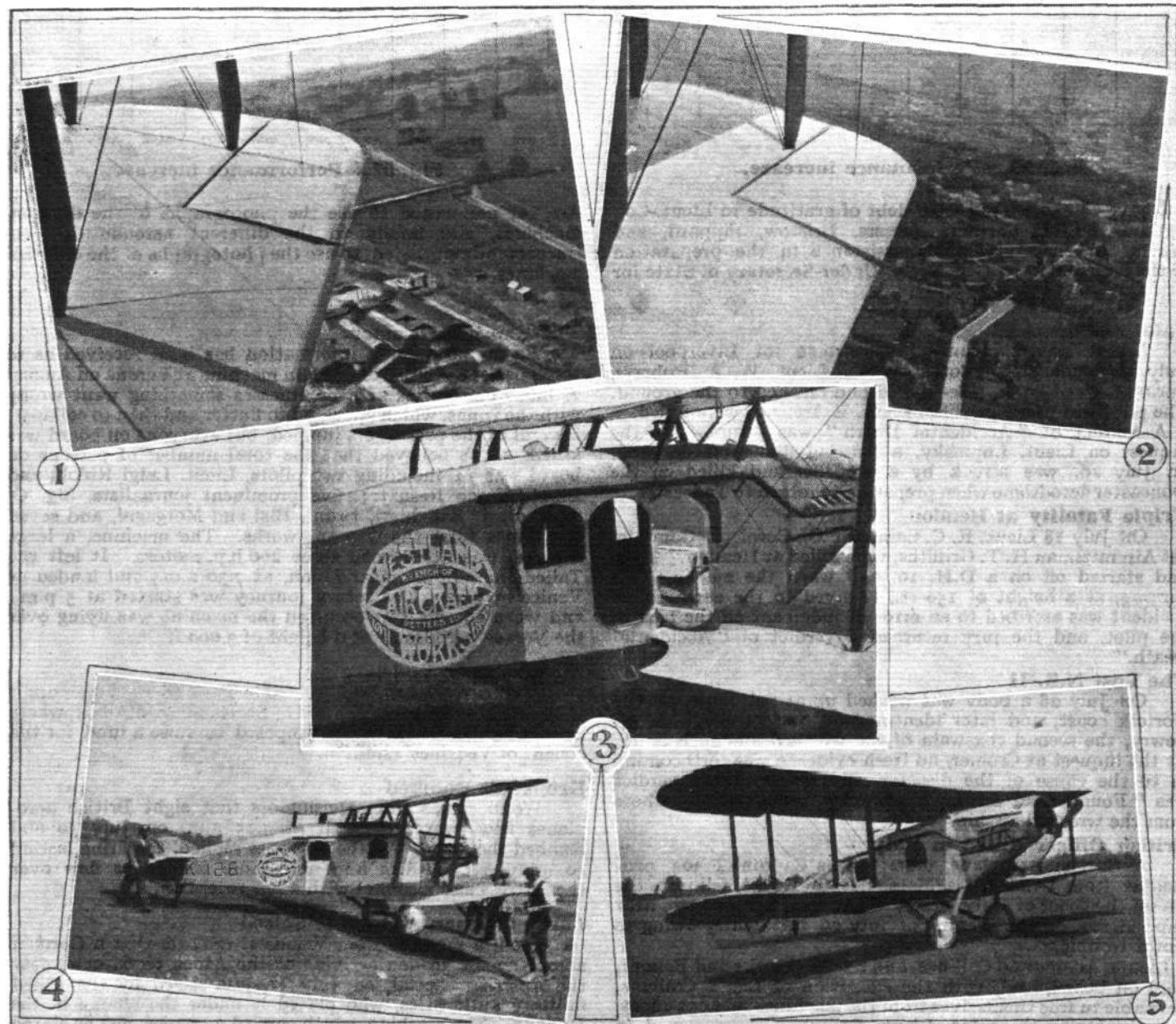
From a message from Vienna it appears that a German aeroplane—R 39—on arriving at the Aspen aerodrome, near the Austrian capital, on July 31, was seized by the Allied military authorities, who placed it under the charge of the Italians. The machine, which carried 22 passengers, is stated to belong to a German aerial navigation company, and to have flown from Kamenet-Podolsk (Ukrainia), a journey of about 480 miles.

## "WESTLANDS" OF YEOVIL

YEOVIL, before the War, was chiefly associated in the minds of most people with the manufacture of oil engines, the name Petters being a household word in this connection. During the War Yeovil has become known for something besides oil engines—still in connection with the old name of Petters it might be pointed out. Always alive to the possibilities of the times, those responsible for the management of Petters, Ltd., foresaw, quite early in the War, that there would be a great demand for aircraft, and consequently an aircraft branch was founded, with a separate management, but on which Mr. P. W. Petter and Mr. R. A. Bruce were joint directors. The aircraft branch of Petters, Ltd., became known as the Westland Aircraft Works, and for a start machines were constructed to other people's designs. However, it was not very long before it was decided to produce original machines, for the design of which Mr. A. Davenport became responsible, and two types which resulted will be familiar to most people in touch with the aviation industry, the "Wagtail" and the "Weasel." Nor are these two the only types which have emanated from the Westland Aircraft Works, although they are, perhaps, those best known.

Last week we had, in company with representatives of the technical press, an opportunity of inspecting the Westland works at Yeovil, and to see the new commercial aeroplane which has been designed and built since the Armistice. The party was met at Paddington station by Lieut.-Col. Meares, who is now associated with the London end of the firm. On arrival the visitors were introduced to Mr. R. J. Norton, commercial manager of the firm, and to Mr. F.

Chandler, who is works manager. The party, which also included Capt. A. S. Keep, M.C., late R.A.F., having by motor reached the works and aerodrome, a tour of the works revealed the fact that a great factory has been built during the War, in which the most up-to-date machinery is running at full pressure, producing, among other machines, Vickers-Vimy bombers, of which a large order is being completed. One also noted several Airco (de H.) biplanes, while the large and well-organised drawing-office was busy with the designs for several post-War commercial machines, one of which is already in production, the first machine of the batch being in flying trim on the day of the visit. This machine, which is known as the Westland "Limousine," has been designed to combine the qualities of a luxurious motor and a yacht. As the accompanying illustrations will show, the "Limousine" has a totally enclosed cabin, with seating accommodation for pilot and three passengers. The pilot occupies the rear port seat, which is raised above the floor of the cabin so as to bring his head above the roof, in which there is a cockpit for the pilot, whose head is protected from the wind by a screen. One of the passengers sits next to the pilot, but a little lower so as to be right inside the cabin. The two remaining seats are placed near the front wall of the cabin, the occupant of the port seat facing forward, the other passenger sitting with his back to the cabin wall. This object of this placing was not clear at first, but was explained when Mr. Norton took his seat in the machine, the other front seat being occupied by a shorthand typist, who calmly placed her typewriter on a little hinged table attached to the front



THE WESTLAND LIMOUSINE: 1 and 2, A couple of snaps through one of the starboard windows. 3, The cabin is entered through a door in the side as comfortably as on a motor car. 4, Three-quarter rear view of the Westland limousine. 5, Three-quarter front view of the Westland limousine

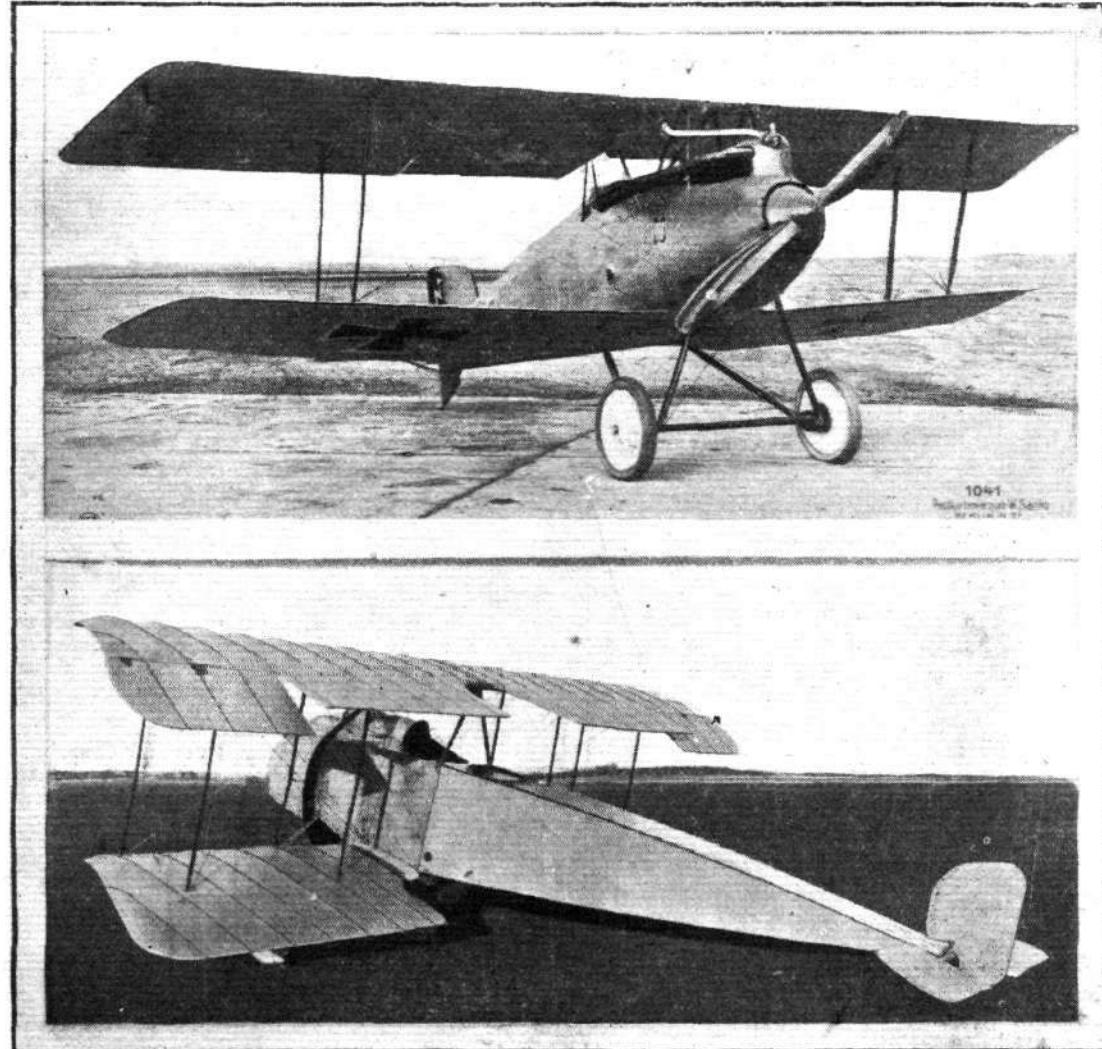
wall of the cabin. The writer of these notes was requested to take the remaining seat so as to be in a position to testify that a message was dictated by Mr. Norton during the trip, was first taken down in shorthand, and was then transcribed on the typewriter. When Capt. Keep had taken his seat the party was complete, the chocks under the wheels were taken away, and the machine commenced to taxi along the ground. When the far side of the aerodrome had been reached the pilot swung the machine around into the wind, and opened the throttle. The Rolls-Royce Falcon commenced its roar—at least one presumes it did, since inside the cabin the noise was no more than that of an engine running well throttled down, and in a few seconds we were in the air. But what a difference to the ordinary open aeroplane. There was no more noise than in a railway carriage, and as for draught, there simply wasn't any. At the same time the ventilators in the roof prevented the air from getting at all stuffy. There we sat, as comfortable as if we had been at rest on the ground, and yet we were travelling along at over a hundred miles per hour. Mr. Norton's voice could be heard as he dictated his letters, while below a lovely panorama was unrolled, the beauty of which one could enjoy undisturbed by any rush of wind or by any unpleasant noise. The day was hot, and consequently there was a number of heat bumps; but for the latter one had little sensation of movement. As we climbed higher the bumps grew less, and finally appeared practically to cease. By now Mr. Norton had finished his dictation, and the typist commenced to transcribe. As it happened, however, that particular letter was not destined to be typed in the air, for the typewriter had been so fixed that while it worked quite well where small letters were concerned, it was too close against the upholstery on the cabin wall to permit of writing caps. As Mr. Norton refused to have the letter written entirely in the lower case he called to the pilot to descend. After a short glide we landed without incident. The writer of these notes was quite satisfied as to the cause of the difficulty and would willingly testify to the practicability of both dictating and typing during flight, but Mr. Norton insisted upon having the matter put right, and in a subsequent flight, when the typewriter had been moved out from the wall, the experiment was repeated and succeeded without any hitch.

It will, therefore, be seen that in the Westland limousine one has a machine in which it will be quite feasible for a Cabinet Minister, or the head of a large commercial undertaking, or anybody else whose time is valuable, to travel from one place to another, faster than is possible by any other means, while at the same time doing it in greater comfort. Further to save time it will be possible for the owner of such a machine to dictate correspondence and to have it typed out *en route*, ready for posting as soon as the machine reaches its destination.

That it will be more expensive than going by train may be granted, but to the busy man, whose time is worth a lot of money, the saving in time which the aeroplane can effect will more than compensate for the extra cost.

It is not, however, to the business man only that a machine like the Westland limousine will appeal. The wealthy man on pleasure bent could not wish for a more comfortable, nor for a more entertaining way of touring either at home or abroad (when the authorities open the barrier to international flying). There is no doubt that once the charms of flying in the modern comfortable aeroplane are realised by those whose means of transport or for pleasure—and it would be idle to pretend that it is at present within the reach of the poor—this mode of travel will become increasingly popular. The three old-time enemies of comfortable air travel—noise, wind and oil—are absent in the modern limousine of the air, and when this fact has once been well established we shall soon see great numbers of these machines in frequent use by their private owners.

After a number of joy-rides had been made by the visitors, the party was taken to tea, when Mr. P. W. Petter, in a few brief words, outlined the policy of the Westland Aircraft Works. The firm, it is gratifying to learn, intends to remain in the aviation industry, those responsible for its management being firm believers in the future of aviation, and being ready to face the difficult times which the industry will have to pass through before flying comes into its own. We should have liked to have given this week a more detailed description of the Westland limousine, but space calls a halt, and we hope to record the fuller description in next week's issue.



Two of the lesser-known Hun fighters, that on the top being the Friederichshafen single-seater scout, and below the Gotha short span two-seater.

## THE AMSTERDAM EXHIBITION

AFTER sundry postponements, mainly due to trouble in getting the aerodrome into going order, the first Dutch Air Exhibition was officially opened on August 1 by M. Koenig, Minister for Public Works. Although at that time the whole of the British exhibits had not arrived, this section made a good show, including a Vickers-Vimy commercial type, Handley Pages, both the four and twin-engined models, a number of Avros, a F 5 flying-boat built by the Gosport Aircraft Co., B.A.T.'s, Blackburns and Aircos. There is also a good British display in the accessories section. As a sample may be mentioned the stand of the Farringdon Propeller and Engineering Co., Ltd., on which there are samples of their propellers and windmills, as well as the Walker Boring jig. France has also a good display of Farman (including a Goliath), Caudron, Breguet and other machines, while Holland is represented by Fokker, Spyker and Picus. There are also exhibits from Italy, Sweden and Spain. German firms are debarred from showing, but there is a Friedrichshafen bomber in the Dutch Navy section.

## FLYING TO HOLLAND PERMITTED

THE Air Ministry announces that, pending a definite agreement on the basis of the Air Convention, and in order to enable Dutch and British aircraft to visit England and the Netherlands, should they so desire during the exhibition, arrangements have been made with the Netherlands and Belgian Governments for the temporary opening of civil communication by air between the Netherlands and Great Britain.

In view of the distance of the sea passage from the east coast of England to Holland, seaplanes only may cross by this route, and aeroplanes will proceed to Holland *via* the Straits of Dover, France and Belgium. Arrangements have been made, by the courtesy of the Belgian authorities, for a refuelling base at Evere, near Brussels. Aeroplanes proceeding to Holland by this route may cross the Belgian frontier at any point which may be suitable.

The following is the text of the agreement with Holland:—

(a) Except in emergency, both seaplanes and aeroplanes entering Holland must land at Amsterdam.

(b) Except in emergency, aircraft entering England must land at:—(i) Seaplanes, Felixstowe; (ii) Aeroplanes, Lympne or Hounslow.

(c) Seaplanes will cross the Dutch coast between Scheveningen and Ymuiden. Aeroplanes entering Holland *via* Belgium may cross the Belgian frontier at any point which may be suitable.

(d) Seaplanes will cross the English coast between Orfordness and the Naze; aeroplanes between Folkestone and Dungeness.

### Resettlement

THERE are many officers and men of the R.A.F., who are demobilised or are about to be demobilised.

In order to assist those who are undecided or are seeking advice as to their prospects in civil life, the Editor has arranged for an expert, with wide experience of service, industrial and educational conditions, to give advice to those who may solicit it through the medium of this Journal.

Applications, which must be in writing, should be marked *Resettlement*, and addressed to the Editor, FLIGHT, 36, Great Queen Street, Kingsway, W.C. 2. They will be dealt with in these columns, as far as possible, in rotation.

**S.W.S. AND OTHER EX-CADETS.**—As you are still at a unit your demobilisation officer should furnish you with full particulars re "Honorary Commissions for Ex-Flight Cadets."

### Instruction in Aeronautical Engineering

THE East London College (University of London) is arranging for two courses of instruction in Aeronautics, commencing in September next. The first course is of one year's duration, and is suitable for those who have some knowledge of engineering and science subjects. The second is a three-years' course in Engineering and Aeronautics for the B.Sc. (Engineering) Degree of the University of London, and will be conducted by Mr. N. A. V. Piercy, B.Sc., a recognised teacher of Aeronautics of the University. Experimental wind tunnel work will form an important part of the course, and facilities for research will be available. Particulars of these courses may be had on application to Mr. E. J. Wignall, Registrar of the College.

### No Peace Flying Over London

IN response to enquiries received the Air Ministry made it known that during Peace Celebrations there would be no relaxation of the General Safety Provisions (para. 5, Air

Several of the British machines have crossed to Holland by the aerial way, including a small circus of Avros, comprising a two-seater, two three-seaters and a five-seater, under the command of Capt. W. G. R. Hinchcliffe, D.F.C., A.F.C., a V 1500 Handley Page, piloted by Lieut.-Col. Douglas, and the Gosport F 5 flying-boat, fitted with two 350 h.p. Rolls-Royce, which on July 30 made the trip of 340 sea miles from Southampton to Amsterdam in under five hours. The F 5 was in charge of Lieut.-Col. R. Hope Vere, A.F.C., and carried Dr. Bisschop, the legal representative of the Dutch Government in England, Mr. M. N. Volk, the general manager of the Gosport Co., Mr. J. W. Nicholson and a mechanic. Capt. Sir John Alcock visited the exhibition on August 3, and was given a most enthusiastic reception.

Unfortunately the opening was marred by a fatal accident. A Dutch naval seaplane, while trying to alight on the water, fouled the roof of the Hillens machine works. Lieut. Bakker, the pilot, escaped with a broken leg, but the mechanic, Sergt. Krooge, was killed.

## FLYING TO HOLLAND PERMITTED

(e) All machines and pilots taking advantage of these facilities must be provided with and carry such documents as may be required by their respective Governments, or by the competent authority.

(f) Passports will be carried by both passengers and crews, but such passports will not require the Dutch visa on leaving the United Kingdom if the period of stay in Holland does not exceed two days.

(g) No goods must be carried, either on the outward or return journey, without Customs formalities being observed.

(h) If aviation material is destined definitely for Holland, Customs dues must be paid.

(i) No photographic apparatus for use during the voyage may be carried.

(j) A manifest of goods carried under *g* and *h*, and a full list of passengers under *f*, will be carried by the pilot in charge of the machine.

The forms referred to in (g), (h), and (j) are as follows:—

Aircraft report and description of cargo, Form 150.

Notice of intended departure with goods, Form 151.

Manifest of general declaration of cargo, Form 152.

Pilot's declaration and clearance (outwards) without goods, Form 153.

Pilots intending to fly to Amsterdam will be afforded all available information in regard to aerodromes and including aerial route directions, etc., and copies of the above forms on application to the Controller-General of Civil Aviation, Room 521, Kingsway, W.C. 2.

Navigation Regulations) in regard to flying over town areas or populous districts, either for the purpose of taking photographs or for any other purpose.

On Saturday, July 19, the date of the Procession, no flying whatever was permitted over London within a circle of four miles radius from Charing Cross.

### Factory for Sale

THE American aircraft factory at Shaw, near Oldham, is for sale by private treaty. The land and factories section of the Disposal Board of the Ministry of Munitions states that it covers six acres of land, and that its buildings are mainly of brick construction with concrete floors and timber roofs covered with rubberoid. Water and gas are supplied from the public main, and arrangements can be made regarding the electric power. Sidings connect the factory with the Lancashire and Yorkshire Railway.

### Sales of Surplus Government Property

THE latest official figures of sales of surplus Government property show that the sum realised is now over £141,000,000. The figures include sales amounting to £32,800,000 which were completed after the date of the Armistice and prior to the setting-up of the Disposal Board of the Ministry of Munitions. The total of £141,000,000 carries the sales up to July 12, and includes £76,000,000 for sales on trading account and £65,000,000 for other surplus stores.

### A Blériot Omnibus

THE French Blériot works have been busy on a new passenger-carrying machine which should be ready for its trials in about a month. It is fitted with four motors aggregating 1,200 h.p., the span of the machine is 29 metres, and the lifting surface 150 square metres. It has been designed to carry 28 passengers and to make flights of six hours' duration.

## CIVILIAN FLYING

### HENDON

FROM a spectacular point of view the cross-country race at Hendon last Saturday was somewhat disappointing, only three out of six entries actually starting, after a long delay. Rain also started simultaneously with the race, so that the progress of the machines was difficult, if not impossible, to follow.

The starters in the cross-country race were Lieut. G. R. Hicks, D.F.C., Maj. R. H. Carr, A.F.C., D.C.M., and Capt. D. H. Robertson, A.F.C., all on Avro biplanes, 110 h.p. Le Rhone engines. Carr got home first, and Robertson was second, their handicap times being respectively 18 mins. 35 secs. and 20 mins. 26 secs. The course was over the Hendon-Bittacy Hill-Hendon circuit. Among the visitors were a party of eight Soudanese chiefs—who are on a mission to England—four of whom enjoyed the thrills of flying.

On Monday there was a race to Bittacy Hill in which there were four starters, Maj. Carr (Avro), Capt. P. R. T. Chamberlayne (G.-W. Bantam), Lieut. Hicks (Avro), and Capt. C. R. Vaughan (Bat Baboon). Maj. Carr, who received 39 secs., was the winner in 16 mins. 29 secs., securing the London Flying Club Trophy and £20, while Capt. Chamberlayne, who was only beaten by 10 secs., took the London Flying Club Medal and £10. Lieut. Hicks was in trouble with his engine, and Capt. Vaughan was a lap behind and did not continue. The other event of the afternoon was a double parachute descent by Mr. Newell from a height of 1,500 ft. "Flips" were in great demand, and 200 passengers were taken up.

### HOUNSLAW

During last week a good many cross-country trips were made on Avro machines. Sir Hari Singh, of Kashmir, flew to Swanage and back on Sunday. Another machine was taken for the week-end and visited Cowes and Dover, while other bookings were to Crewe, Southampton, Margate, Bristol and Worcester. On Saturday Mrs. Leon Errol, who had arrived at Southampton in the *Aquitania* from New York, flew in an Avro from Hamble, arriving at Hounslow at 10.15 a.m.

### BLACKPOOL AND SOUTHPORT

During the past week the Avro pilots at Blackpool have been kept busy, and we understand that the ten thousandth passenger was taken up, which is remarkable considering that the flying there did not start until the middle of May. There has been no accident during the period, with the exception of one machine which landed in the sea, owing to the

high-tension lead dropping off; the Avro motto of "Safety First," which is painted on large notice boards all round the aerodrome, being well maintained. So confident are the public nowadays that they turn up for flights in any weather—rain, blow or hail—whereas when the show started, they would not look at a machine if there were the semblance of a wind. Several days last week regular passenger flying was carried out in winds of between 30 and 40 m.p.h. One day the wind was so strong that it lifted several machines 5 ft. from their sandbag moorings on the beach. Several five-seater machines, fitted with 160 h.p. B.R. 1 engines are now in commission.

Southport is proving a good second to Blackpool, and among the passengers taken up was the Mayor, Alderman J. Wood, who enjoyed looping and spinning. Quite half the passengers have been ladies, and six of them have asked to be allowed to go through a course of lessons. One man arrived at Southport a few days ago about 9 p.m.—when it was blowing a gale and the clouds were low—and offered £200 for a flight to the Isle of Man, explaining that he wanted to give his wife a surprise.

### NEW AVRO STATIONS

The Preston Aerodrome has been granted a temporary licence, but requires a certain amount of levelling. Negotiations are well under way for opening landing grounds at Kendal, where there is only one R.A.F. aerodrome within 50 miles, and near Llandudno on the Moorfa, a splendid central station for all North Wales, but the proximity of the Snowdon range and the Great Ormes Head will make the flying there somewhat bumpy. A station at Rhyl in North Wales was opened last week, flights being made by Maj. McMinnies, A.F.C., Capt. E. Maitland-Heriot, D.S.C., and Lieut. Hudson.

Lieut. Moxon has been busy all the week on a small stretch of sand on the beach at Douglas, Isle of Man, where he receives many enquiries as to when the cross-channel service is to start.

### AT OTHER CENTRES

Two Avro machines, which arrived at Swansea on July 26, have taken up more than 200 passengers, the ball being set rolling by Councillor George Henning, in the unavoidable absence of the Mayor.

At Margate last week-end 107 passengers were carried in Avro machines. The record at Brighton last week was 168 passengers, and one party made a cross-country trip to Chichester for the races at Goodwood.



"The Limes," in fir-land.—The C.O.'s quarters at an R.A.F. "Station."

## U.S.A. NAVY F-5-L FLYING BOAT

(Concluded from page 1026)

THE hull is built up around four *longerons*, as is a land plane, and has in addition a keel and a planked V-bottom that is flared out to present more landing surface. The flared out portions are called fins, and in this place are an integral part of the hull structure, and are continued aft, and streamline into the hull sides. This is not the case in many previous seaplanes, namely, the H-12 and the HS-1 and 2, where the fins are stopped abruptly about one-third the hull length aft from the bow, and the advantage is increased strength and better streamline form.

Before entering into a detailed description of the hull construction, it may be well to define some of the terms used. The following defines them roughly, and is the order in which they enter the hull construction:—

*Keelson*.—A wide thin plank extending from near the bow to the stern, above the keel.

*Keel*.—The bottom-most longitudinal member forming the backbone of the hull.

*Floor Frames*.—The transverse planks jointed at right angles to the keelson.

*Longerons*.—All longitudinal members extending from the bow to the stern with the exception of the keel.

*Fin Edges*.—The two outside longitudinals of the fins.

*Stringers*.—The longitudinal strips connecting the floor frames on the bottom and the strips on the fins.

*Bulkheads*.—All transverse veneer structures dividing the hull framing.

*Transverse Bracing*.—The central structure connecting the hull to the two wing beams extending through the hull.

The keelsons are  $\frac{1}{4}$ -in. basswood, built in not more than five sections, having at least a 9-in. scarf at the joints and held together with copper rivets. To this the floor frames, also  $\frac{1}{4}$ -in. basswood, are notched and securely riveted by two corner stringers. Throughout it will be noted that built-up members are used, permitting the use of readily available material.

White ash is used for keel, *longerons*, fin edges and the bent ends of the stringers. These two may be built up or spliced, but not more than four sections may be used. The scarfs in the keel must be at least 18 ins. long, and are copper riveted. Formerly a straight scarf was used, as it was considered a better production proposition, but now a stepped scarf is used, as it was found that the time saved in making the straight scarf was lost in assembly.

Similar methods of splicing are used in the case of the *longerons*, fin edges and stringers, and here the joints are served and doped. Care is taken in the location of all splices in longitudinal members, so that a number of splices will not occur in any one section, causing a weak section and failure. For example, not more than two *longeron* splices may appear in any one bay, and these must both appear in either the upper pair—to balance each other. By this method of splicing ash longitudinals, and the careful location of joints, short lengths of ash can be used. And this is important, as airplane ash under any condition is not easy to secure. All ash members are steam bent to assembly shape before assembly on the hull forms. This bending and the splicing of the complete longitudinals are done in a separate part of the shops. Likewise the keelsons and floor frames, stringers, bulkheads, posts, struts, braces, etc., are sub-assembled, and when delivered to the hull erection floor are ready for assembly but with little fitting. This idea is carried out even to the bottom planking, which is delivered in amounts sufficient for one hull. But a detailed description of this sub-assembly is too involved for comment here.

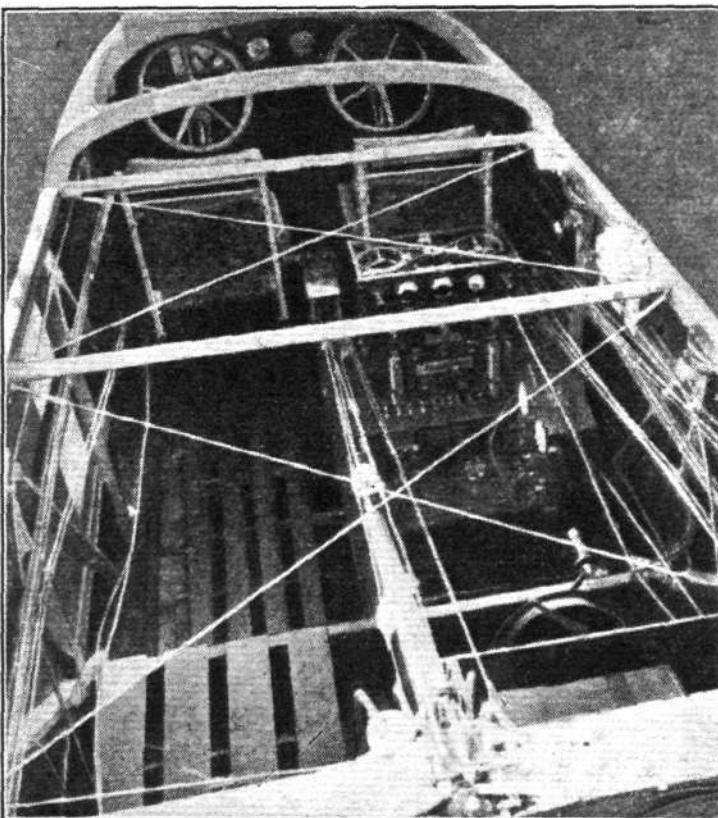
Throughout the hull construction all parts are tied together by metal fittings—and concerning these metal fittings three points are noteworthy as aiding increased production. The first is a choice of material used. One generally considers the steel entering into airplane construction as being the best possible, and heat-treated to the greatest strength. But fittings on this plane are in general soft or mild carbon steel.

The reasons for this are that such steel can be procured almost anywhere, is easily worked and welded, and loses little of its strength through abuse in brazing, welding or forming. The second point to be noted in the fittings is that, with few exceptions, they are built up from flat patterns bent and brazed or welded. This eliminates drop forgings, which were so difficult to secure, and permitted production to go ahead without waiting on the construction of dies. The third feature of the fittings is the use of identical fittings in many places. For example, throughout the hull, the junction of the posts and the *longerons*, the point of attach-

ment of the floor frames to the *longerons*, and the plates covering the joints of the hull bracing—fittings differed only slightly at the different stations.

However, originally each similar fitting differed slightly, necessitating a separate template, a separate print, part number, operations, etc., throughout the whole construction. But a study was made, and an "average fitting" produced that would suffice for several similar stations. The fact that such fittings did not exactly fit anywhere, or had lugs that were not needed in other places, amounted to less than they saved time in production. And they were structurally as good.

A further difference in the construction of this hull and that of similar hulls of its predecessors is to be noted. On previous models, riblets were used to connect the keel with the fin edge stringers. These riblets were about  $\frac{1}{2}$  in. by  $\frac{1}{4}$  in. ash, spaced at distances varying from 9 to 15 ins. transversely across the boat bottom. To bring their bottom surface flush with the stringers, lower *longerons* and fin edges, it was necessary to notch keel, stringers, *longerons* and fin edges that they might be set in. And it was a slow, tedious job. On this unit, the riblets are omitted, though several ash-tie strips are used to connect the keel with the fin edges.



View of the pilot's and wireless operator's quarters on the F-5-L flying-boat

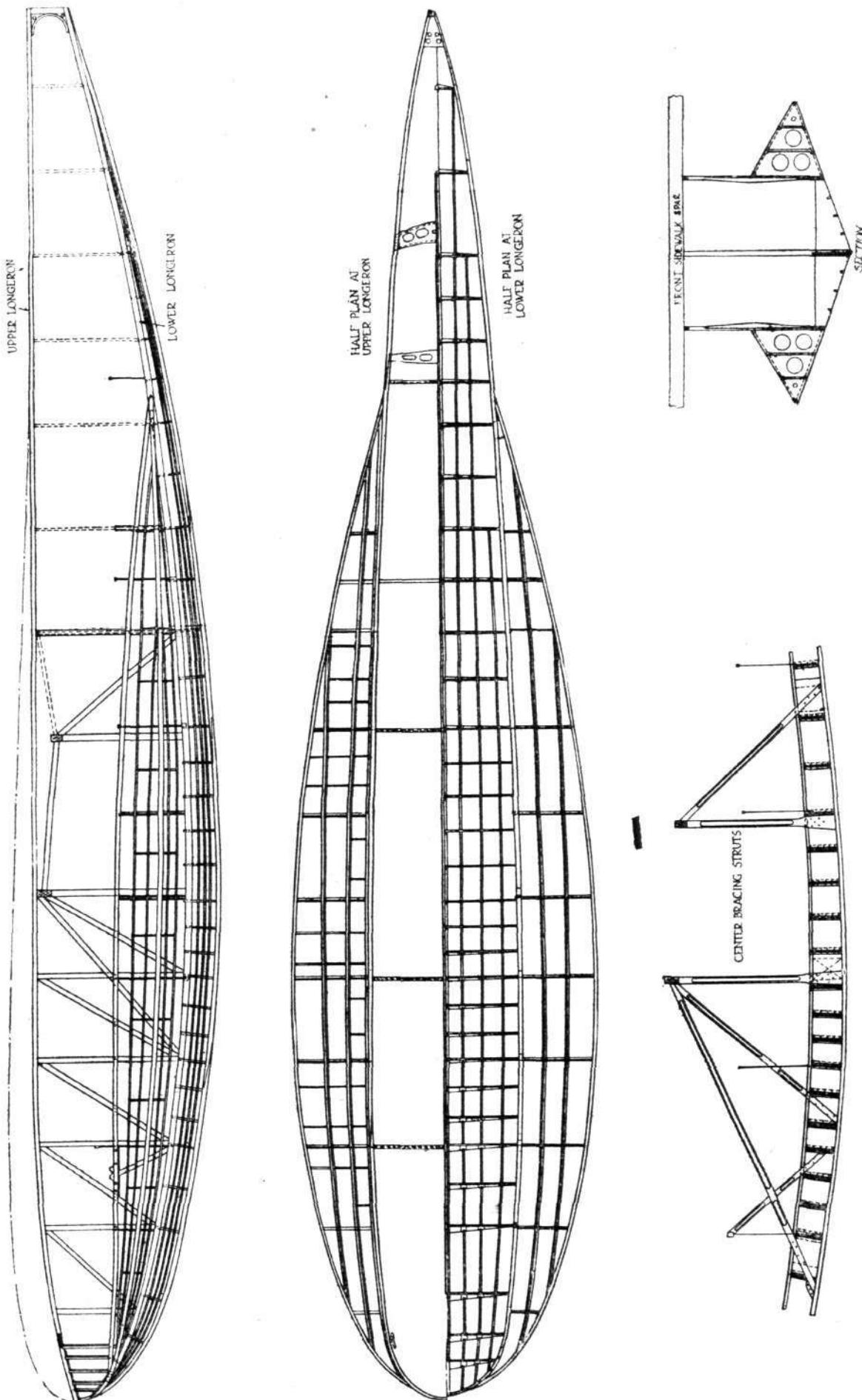
It is considered that these, together with the planking, provide transverse strength in abundance. Another feature in the construction is the extensive use of steel tubing as struts and posts in the body bracing. This is particularly noticeable in the tail, where the parts are under no great strain, and are not used for the attachment of other parts. Steel tubing is readily procured, and ready for use by simply cutting to length.

The central or transversal bracing unit is a complete unit in itself, and is set up as a separate assembly previous to installation in the hull. This differs from the usual construction and permits the use of templates to assure accuracy. The transverse bracing connects the hull to the wings and the hull may be said to be built around this unit. By making all transverse bracings identical, any set of F-5-L wings, engine mountings, etc., may be more readily installed. It is also to be noted that the wing spars passing through the hull are spliced at the centre. These spars, styled the sidewalk spars, as they carry a short veneer covered wing section at each side of the hull that is used as a sidewalk for the

mechanics to reach the engine, may be removed when the hull is packed for shipment, permitting the use of a much smaller shipping crate.

both layers are at an acute angle to the keel. As riblets are eliminated, the right-angled inner planking tends to replace them as strength members. This inner planking

## Hull Construction Plans of the F-5-L Navy Flying Boat



The bottom planking comprises an inner and an outer skin, each of  $\frac{1}{2}$ -in. cedar. The inner skin is placed at right angles to the keel, differing from usual practice wherein

is either Port Oxford or Spanish cedar in random widths of from 4 to 10 ins. The outer planking is placed at an angle of 45 deg. to the keel, the acute angle being on the aft

side. All pieces are from 4 to 5 ins. wide, Spanish cedar, and are screwed to all longitudinals. The two layers of planking are secured together by brass clinch nails. Courtrai, a special fabric, is laid in marine glue between the two layers of planking, and is used extensively in rendering all joints tight. All planking is laid with a slight clearance to allow a go-and-come resulting from moisture changes.

The bottom steps are secured in place after the hull is planked. They are two layers of  $\frac{1}{8}$ -in. mahogany planking, fabric and marine glue between, screwed and clinch-nailed together, and secured to the hull bottom by copper rivets, being separated from it by triangular ash strips. The forward ends of these steps are scarfed and set into the hull planking, a thick brass strip being set in flush over the joint. For the rest of the hull  $\frac{1}{8}$ -in. three-ply waterproof veneer is used.

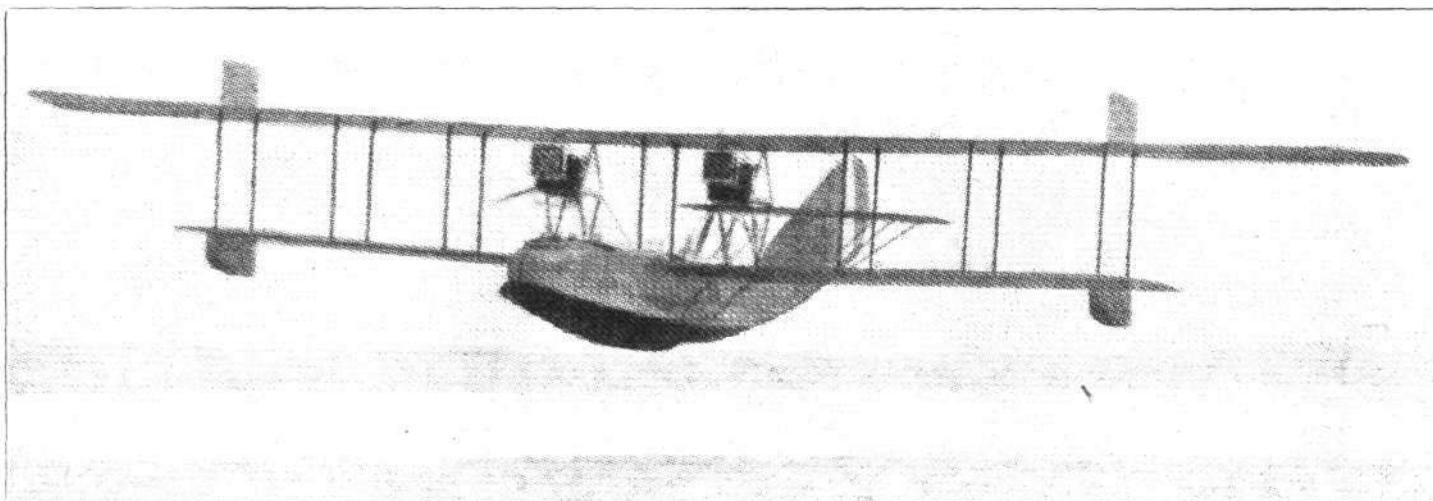
The top plane is built up in five sections, comprising a centre section of 13 ft. 6 ins. span (108 sq. ft.), two intermediate, 27 ft. span (216 sq. ft. each), and two outer extensions, 15 ft. 11 ins. span (95 sq. ft. each). The lower plane is in four sections, consisting of two centre sections (or sidewalks) mounted one on each side of the hull, giving the same overall span as the top centre section and having a combined area of 66 sq. ft. The balance of the lower surface consists of port and starboard wings, 30 ft. 5 ins. span (240 sq. ft.) each. Vertical "non-skid" fins are mounted above the top planes at each outermost interplane strut.

An extended technical description of the panel, strut and tail construction could be expanded to many volumes. But the outstanding features of these are laminated spars, simple

leaf and the strut end, and the usual strut socket is eliminated. In detail, the strut end is squared down, drilled to mate with the central cloverleaf hole, and a steel tube fitted in the end to give greater bearing and prevent the strut end from being crushed when the through-bolt is tightened. The through-bolt has a standard eye head, permitting the attachment for the drift and anti-drift wires, where a single wire is used. When double drift wires are used, the through-bolts holding the flying and landing wire clevises are made with an eye. Bearing for the strut ends on the spar is secured by means of a thin bearing plate between the strut and the spar.

It was observed that considerable time was lost in shaping the tapered streamline section struts, and furthermore, these being in two-piece construction, required thick material that was difficult to obtain. Hence, a three-piece uniform section strut was chosen. As stated, this strut is three-piece, and all the lightening is done in the central portion. In the rough it is a flat board, the length and width of the strut, with a series of oval holes cut out of the central portion on a vertical spindle shaper. The cheek pieces are then glued on each side, and the strut rough-machine planed to a streamline section. It is then finished to the desired section by hand.

Two Liberty engines comprise the power plant. These engines are identical with the engines used by the Army, with the exception of the pistons, which pistons are given more clearance, so that the compression pressure is reduced. The result is a slight reduction in maximum horse-power, but greater engine life. This is advantageous because in



The F-5-L flying-boat in flight

strap type wing and strut fittings and laminated uniform section struts.

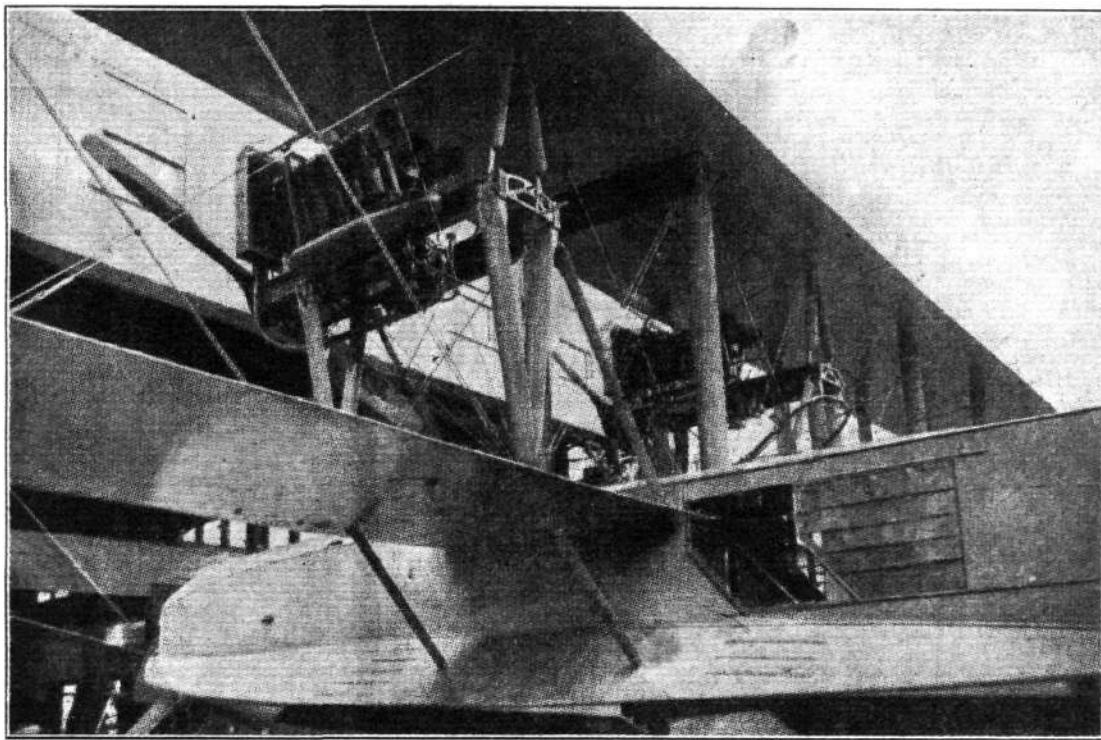
At one time laminated or spliced spars were not in favour, but the shortage of long spruce necessitated the use of laminated and spliced spars, and it is found that the laminated spar is better than the unlaminated one. Outside of the economy of material, the ease of drying pieces of small cross section and the resulting dependability of built-up spars more than off-sets any additional expense in manufacturing. Two types of laminated spars are used—the two-piece and the three-piece. The former is simply two pieces placed back to back, and glued together. The two halves are of equal thickness, and are lightened as was the solid spar except at splice positions. Scarfed splices are used, and staggered in the two halves. The two-piece is used in the following places: all front spars (except engine section), horizontal stabiliser spars, and rear aileron spars. The three-piece spar comprises a thin piece sandwiched between two thicker outside pieces, glued together, and lightened similar to the solid spar, except at splices. This construction is used in the sidewalk and engine section, or for rear spars. Of the two types, the two-piece is considered stronger, and hence the above distinction of their use.

The idea of using strap fittings and the elimination of forgings and machined fittings extends to the strut and wing fittings. Here also mild carbon steel is used, cut from flat patterns and bent to shape. The base wing fitting is a U-strap, bent around and bolted to the spar. From it lugs are bent for interwing wiring, and the interplane side has a cloverleaf extension for the attachment of the struts and wire terminals. These are reinforced by washer plates to provide bearing for the bolts. Roughly, the spars are secured to the strut ends by a bolt passing through the central clover-

leafplane service long patrols place a premium on dependability and a seaplane does not habitually frequent high altitudes or require the maximum available horse-power.

In the main, the engine mounting differs only slightly from the mounting of the Liberty engines in the Curtiss H-12 and H-16 seaplanes. Horizontal laminated engine bearers are carried on wooden V-struts over each main wing hinge fitting, and are attached to the upper panel by tubular A-struts. The radiator is carried on a bracket at the front, and the oil supply in streamlined tanks at each side of the bearers. However, in details, the F-5-L mounting is simplified and made a better production-proposition. The first step was the elimination of drop forgings. Strap fittings built up and brazed together are used for attachment of bearers to V-braces, and the upper attachment of the A-brace to the engine section is also a strap fitting. This attachment is strong and simple. The ends of the tube are first fitted with a tubular sleeve, and then formed to a U-section. In addition to the simplicity of construction, this end is extremely rigid. The A-braces are attached to the spar fitting through a universal joint bearing plate. This is also a built-up fitting. The forward A-brace is bowed to clear the engine cylinders, and the halves are tied together by a cross-tube and through bolt. This brace must be removed before the engine can be taken from the plane, and the removable cross-tube and through bolt permit this to be done. Differing from previous construction, the engine bearers are carried forward so that a straight radiator bracket may be used. Previously, the bearers were cut off by the front engine flange and arched brackets used. However, the straight bracket is simpler to construct, and is possible on Liberty installations.

In an installation of this nature, it is, of course, impossible to start the engines by hand cranking on the propeller.



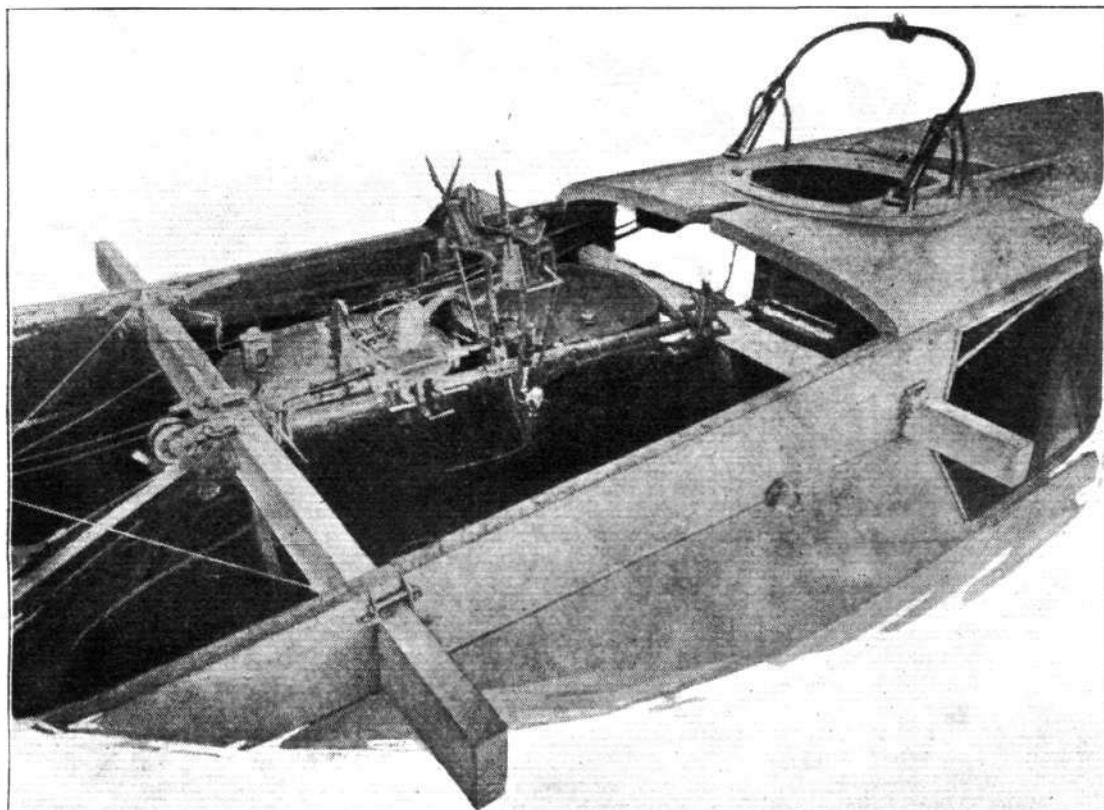
Detail view of the F-5-L flying-boat, showing the engines and rear "cabin"

For this reason a rear hand starter, comprising a reduction gear and clutch engaging the crankshaft is used. One man can readily turn the engine over, though two are generally used. As stated, the oil tanks are streamlined, cylindrical, and mounted at each side of the engine bearers. The total capacity per engine is 17 gallons, and the two tanks are connected by a manifold, the division simply being constructional. In later planes the side oil tanks are being superseded by one streamlined tank mounted between the engine-bearers and behind the engines. This serves to clean the installation up to a marked extent. A long-distance thermometer bulb is installed in the oil return line, and the gauge is mounted in the mechanics' compartment by the tanks. The oil-pressure gauge is installed on the pilots' instrument-board. A water thermometer gauge likewise is in the mechanics' cockpit. This location of the thermometers is because engine temperatures are of enough importance to demand quite frequent attention.

The petrol supply is carried in five tanks placed amidships in the hull. There are two large cylindrical vertical tanks, one fore and aft horizontal tank, and two transverse horizontal tanks. The latter two were originally consolidated, but the single tank could not be removed without taking the plane to pieces. All have a total capacity of approximately 498 gallons. As these tanks are below carburettor level, a header or gravity tank is necessary. This is located in the upper wing, between the two engines, and carries about 20 gallons. The petrol is pumped from the hull by a double-barrelled windmill pump, and forced into the gravity tank sump. From the sump leads are taken to the two engines, and the surplus over this amount flows through small holes

in the sump sides into the gravity tank. When the gravity tank becomes full, an overflow pipe carries the excess back through a sight box into one of the tanks. This overflow serves to show the mechanic that petrol is being pumped, and that the gravity tank is full. The construction of the gravity sump is noteworthy. It will be noted that the base of the sump is somewhat below the bottom of the tank, and that the two are only connected through small holes at the sump sides. Hence if the gravity tank be shot away, the supply of petrol pumped may be shut down to the amount used, with the base of the sump alone serving as a header tank. A semi-rotary hand pump is used to fill the gravity tank when the windmill pumps are inoperative. This pump is an English design, and a similar pump is also used for bilge water.

The leads from all the supply tanks are consolidated into one manifold, and by regulating the valves petrol may be pumped from any tank into the gravity tank. However, it all returns into the starboard forward vertical tank, and in flight petrol is pumped alternately from this tank and each of the other tanks in rotation. It is necessary to pump from the tanks in rotation in order to trim ship, and a separate manifold would be necessary to return the overflow petrol to any tank. It is to be noted that the manifold incorporates a filler-valve piped to a union at the hull sides. This serves for the attachment of a pipe-line from a supply boat or tank that the seaplane tanks may be filled by petrol under pressure. Though this method of filling is not much used, it is stated all the tanks may be filled thus in a few minutes, whereas the funnel and measure method takes from a half to one hour.



The petrol tanks and windmill pumps on the F-5-L flying-boat, which are located in the centre of the hull

There are few other points of interest in the petrol system, standard sumps being used to prevent water and dirt from reaching the engine and dial gauges being used on the tanks to show the gasoline supply at hand. Throughout the system all pipe-line connections are through olive joints, and the features here are ease of connection, flexibility, and the fact that full flow of petrol is permitted. As an aid to starting, a small hand primer permits raw petrol to be pumped into the intake manifold.

The outstanding features of the flying controls are the laminated-yoke dual elevator and *aileron* control mounting, and the adjustable rudder bar installation. The yoke itself is built-up of  $\frac{1}{4}$ -in. laminations of ash, glued and riveted together, making a strong and light construction. Each end is extended to form the elevator throw, and the *aileron* control wheels are mounted on brackets at the top. These wheels are connected by an endless chain, from the middle of the lower part of which are taken the *aileron* control wires. The cross-tube is integral with the yoke, and the whole swings on bearings at the hull sides. In addition to lightness of construction, rigidity, and simplicity of wiring, this control affords a maximum amount of room for passing from the front to the rear cockpit, and does not interfere with the legs of the pilots as does a post-type control.

Originally, adjustment of the distance between the pilot and the rudder-bars was effected by shifting the seat. But

this also brought the control wheel closer, and the installation was complicated. Adjustment on this plane is effected by shifting the rudder-bar bodily fore and aft the required amount. The rudder-bar is carried between two straps that are supported on a tubular framework in front of the pilots. These straps have a series of holes, and the rudder-bar may be set to swing on a pin passed through any one of these. A similar adjustment permits the outer end of the bar to be set properly in connection with the rudder-cable. As these pins are set in place by a small brass cotter, any desired setting can be made quickly.

Under severe flying conditions, or in the case of tail or nose heaviness, it is sometimes necessary for the pilot to exert a continuous pressure on the controls. On the elevator or rudder controls, this continuous pressure may be applied at will, in any desired amount through rubber cords, called "bungies." The complete bungy is simply two pieces of rubber cable, connected by a small chain, and having both ends secured to the hull sides. The chain passes adjacent to the control it governs, and is hooked to it at will with a snap-hook. The pressure is applied to the control by extending the rubber cable before the attachment of the chain. All control cables are carried on brass ball-bearing sheaves, and the sheave-housings are fitted with guards to prevent the cables from coming off. With the exception of the point where the *aileron* cables pass through the upper wing, all control cables are open to inspection.

## PERSONALS.

### Casualties

Lieut. FERAY VULLIAMY DEVONSHIRE, 7th Hussars, attached R.A.F., who was killed on July 20, 1919, at the age of 28, on the Afghan frontier, was the only son of Robert and Henriette Devonshire, of Heston, Middlesex, and Maadi, near Cairo.

### Married

Lieut. Sir ARTHUR WHITTEN BROWN, K.B.E., R.A.F., only son of Mr. and Mrs. A. G. Brown, of Manchester, was married on July 29 at the Chapel Royal, Savoy, to MARGUERITE KATHLEEN, elder daughter of Maj. and Mrs. D. H. KENNEDY, of Ealing.

Maj. JAMES LEE JACKSON, M.C., R.A.F., and The Connaught Rangers, elder son of the Rev. Canon Jackson and Mrs. Jackson, The Rectory, Belmullet, co. Mayo, was married on July 23, in Dover Castle Chapel, to ROSAMOND TUDOR, second daughter of EDWARD SLADE, Esq., and Mrs. Slade, The Tudor, Boston, U.S.A., and the Lake House, Quebec.

Capt. GEORGE REGINALD POLLARD, R.A.F., youngest son of Sir George H. Pollard, and Lady Pollard, Sundown, Southport, was married on July 31 at St. Martin's Church, Brighouse, to SARAH DOROTHY, youngest daughter of Mr. and Mrs. John A. CHEETHAM, Oaklands, Brighouse.

Capt. C. C. SNOW, D.F.C., R.A.F., only son of Mr. and Mrs. C. Snow, South Kirkby, Wakefield, was married on July 29 at St. Jude's, Southsea, to GLADYS BURTON, eldest daughter



### The Age-long Glory of Paris

PARIS has been honoured once more by the following "citation" in a recent Army Order:—

"The capital, splendidly worthy of France, animated by a patriotic faith which never failed, bore with firm and smiling courage numerous bombardments by aeroplanes and by long-range guns. It added, from 1914 to 1918, imperishable deeds to its age-long glory."

### Training for Paris-Cairo Flight

By way of training for his proposed flight from Paris to Cairo, Commandant Vuillemin spent three days in cross-country flying. His first stage was from Paris to Marseilles, the 700 kiloms. being covered in 3 hrs. 10 min. The next day he flew to Cazan, the 570 kiloms., including a stop of a few minutes at Agen, being covered in 4½ hours. His longest trip was on the third day to Landau, 925 kiloms. in 7 hours. His mount was a Breguet, with a 300 h.p. Renault motor, and a mechanic was carried throughout the whole 2,200 kiloms.

of the late Gen. COLWELL, C.B., Royal Marines, and Mrs. Colwell, Claremont Lodge, Southsea.

Lieut. J. A. SOMERS-MARSHALL (late R.A.F.) was married on July 22 at St. Mary Magdalen's, Brighton, to WINEFRIE MARY NEALE.

Lieut. PHILIP H. S. TOZER, R.A.F., was married on July 30 at St. Peter's, Parkstone, to MARGARET E. H., younger daughter of the late Edward DAVIES, Machen House, Mon., and of Mrs. Davies, Brufie Lodge, Parkstone.

### To be Married

The engagement is announced between Lieut. WILLIAM HENRY EASTOE, R.A.F., Cape Town, South Africa, son of the late N. W. Eastoe, "one of the Six Hundred," of Leyton, Essex, and FLORENCE MARY, youngest daughter of Walter Hadderton MEIRE, of Brundall, and granddaughter of the late Thomas Lockley Meire, Eytton-on-Severn, Salop.

The marriage of FREDERICK W. LANCHESTER, of 41, Bedford Square, London, and DOROTHEA, daughter of the Rev. Thomas and Mrs. COOPER, of Field Broughton, Lancashire, will take place at St. Peter's Church, Field Broughton, on September 2, at 2 p.m.

### Items

The will of Sec. Lieut. ST. JOHN SALMON BACKHOUSE, R.A.F., Sunbury-on-Thames, killed in aerial combat in Bulgaria, aged 28 years, has been proved at £788.



### Flying Regulations for Switzerland

In the Bill for the temporary regulation of aerial navigation, which has been approved by the Swiss Federal Council, it is stipulated that foreign aeroplanes and pilots will only be admitted to Switzerland in exceptional circumstances by a special permit from the Military Department. It will also be necessary for insurances covering third-party risks up to 15,000 francs (£600) to be taken out for each aeroplane, while pilots must not fly over large towns at an altitude of less than 1,000 metres and over other towns at less than 500 metres. "Stunting" is expressly forbidden.

### Wrecked by a Windstorm

CONSIDERABLE havoc resulted from a windstorm at the Mineola aerodrome, near New York, on July 28, the damage apparently being partly due to the unsubstantial nature of the hangars. Three giant machines, a Martin bomber, a Handley Page, and a Caproni were wrecked as well as a number of small machines. It is believed the hangars were first struck by lightning.

# AIRISMS FROM THE FOUR WINDS.

THAT there is vitality in the administration of the R.A.F. is fairly apparent from the several important official announcements we are able to publish this week, as to the future of the Force. There should be, under the new conditions, no lack of recruits to the *personnel*, both officers and other ranks. There is just one more thing to wait for—the scheme for the Territorial Section of the Force.

THAT the name of Air Vice-Marshal Sir Hugh Trenchard, K.C.B., D.S.O., Commander of the Independent Air Force 1918, should be down for a baronetcy and grant—and a goodly one, although we should have liked to have seen it nearer the £25,000 mark—in recognition of special services during the War, will be a source of satisfaction to all those who have had the honour of serving under him. It was the glorious I.A.F. which really brought home most directly to the German people the hopelessness of their sacrifices at the bidding of the military machine, with the natural sequence in the collapse of that tyrannical caste.

A CHANCE of a life-time now offers to acquire non-rigid airships of the Coastal, Coastal Star, and S.S.Z. types, direct from the Admiralty. Moreover, suitable sheds, of the portable variety, for housing purposes, and other necessary "bric-a-brac" attaching to these sailors of the air, are also available from the same source. For more detailed information touching upon these "blimps" enquirers should address themselves to the Director of Contracts, Branch 10A, Room 81, West Block, Admiralty, S.W. 1.

"SEA PIE" 1919 Summer Number, to the forthcoming publication of which we recently drew attention, duly materialised last week. And a very rich pie it turns out to be, as we anticipated. Some eight pages in colour by such men as W. Baribal, Charles Dixon, W. Smithson Broadhead, etc., are alone worth double the money charged for the whole publication, whilst the letterpress does not lag behind in equal merit, amongst others the names of Keble Howard, W. Pett Ridge, E. F. Benson and H. de Vere Stacpoole standing out as contributors. Black-and-whites are scattered profusely through the book's pages, and these, almost without exception, have a rich humour of their own which we have failed to discover in so many annuals of this character. Any profits go to the Naval Charities, and with all sincerity we are prepared to guarantee that, for the 1s. 6d. charged, every purchaser will not only have real value for his outlay, but have the satisfaction of knowing he is helping forward as good a cause as stands in the name of the British Empire. Therefore, hurry up and get a copy at the nearest bookstall lest you miss it altogether.

*Apropos* the race for the trying out of competitors for the Jacques Schneider International Trophy, to be held at Bournemouth on September 10, under the control of the Royal Aero Club, and the selection, upon the offer of the R.Ae.C. by Messrs. S. E. Saunders, Ltd., the world-famous yacht and aircraft constructors of Cowes, I.O.W., of their premises for the accommodation of the competing machines, a correspondent writes us as to its great suitability as follows: "Cowes Harbour and the Medina are natural air and sea harbours, and no better place could possibly be imagined for the purpose. During the last four years many hundreds of seaplanes passed in and out of Cowes Harbour when it has been choked with transport, and there has never been an accident of any kind. In regard to the distance to Bournemouth, it is only a matter of a few minutes when the machine is actually in the air. It might be noted that the Air Board officials from the very beginning of the War have used the Solent and the Medina as one of the most suitable places for marine work, and only very recently removed some of their F 2A flying boats from Hamble to Saunders' erecting shops."

It was a graceful idea for R 34 to so time her visit to London on Wednesday evening last week as to be able to manoeuvre over Charing Cross Station at the moment when Marshal Foch was taking his departure for France after the

Visit of Honour to London he had just concluded. Our Atlantic airship was sufficiently low to render her huge size appreciable, and when she later steered for a parallel course with Marshal Foch's departing train, the Marshal and his staff must have had an imposing view of the airship.

ON the plea that the expense of maintaining an Air Force Police would not be justified at present, General Seely, at the same time, states that adequate precautions have been taken to ensure that breaches of the Air Regulations are reported to the Controller-General of Civil Aviation. So the Bolshies behind the police strike will not have to devote their time trying to make more victims by pulling the air police out of their machines.

As was announced in FLIGHT many moons ago, "The National Roll of the Great War" is being compiled with the object of providing a permanent register of the names and brief biographies of every one who, in various capacities, fought or worked for the Empire during the War. So great is the preparation of this work of reference, we learn, that collecting branches are being opened in the large centres of the Kingdom and in the Colonies, and the work when completed it is hoped, will be a *real* National Roll.

In addition to soldiers, sailors and airmen, the Roll will contain in special sections the names of nurses, members of the V.A.D., W.A.A.C., W.R.A.F., W.R.N.S., special constables and munition workers whose records are approved by the Advisory Committee of which Brig.-Gen. C. O. Shipley, C.B., is the President. The Joint Editors are Lieut.-Col. W. J. M. Hill, D.S.O., and Capt. S. N. Pike, D.F.C., and the offices are at 1, York Place, Baker Street, London, W. 1.



"Flight" Copyright.  
 Sir A. W. Brown weds Miss Kennedy at the Chapel Royal, Savoy, on July 29. A snap immediately after the ceremony.

# THE ROYAL AIR FORCE

*London Gazette, July 25.*

Lieut. G. D. Daly to be Lieut. from (A.); June 30 (substituted for notification in the *Gazette* of July 1).

The following are granted temporary commns. as Sec. Lieuts. — C. H. Gauntlett, C. H. Haward, P. G. Whittle; July 21.

The following relinquish their commns. on ceasing to be employed: — Sec. Lieut. (actg. Lieut.) A. V. Hastings (Lieut., R. Dublin Fus.); Feb. 10. Lieut. H. Hemingway (Lieut., Middx. R.); Feb. 17; Lieut. (Hon. Capt.) J. E. A. O'Dwyer (Capt., Notts and Derby R.); July 25.

(Then follow the names of 19 officers who are transfd. to the Unemployed List under various dates.)

The rank of Lieut. T. S. Millar is as now described, and not as stated in *Gazette*, April 1.

The notification in *Gazette*, May 13, concerning Sec. Lieut. G. H. Lilley is cancelled.

#### Technical Branch.

Sec. Lieut. (Hon. Lieut.) T. Thomson to be actg. Capt. whilst employed as Capt., Grade (B.), from Dec. 2, 1918, to April 30.

Sec. Lieut. (Hon. Lieut.) T. Thomson to be graded for purposes of pay and allowances of Capt. whilst employed as Capt., Grade (B.), from May 1 to June 30.

The following relinquish their commns. on ceasing to be employed: — Major C. A. Shove, O.B.E. (R.N.); July 1. Lieut.-Col. A. D. Carden, D.S.O. (Major, R.E.); July 11.

(Thirteen officers transfd. to Unemployed List.)

#### Medical Branch.

Capt. R. L. Roe to be actg. Major whilst employed as Major; July 4. T. C. Backhouse (Capt. A.A.M.C.) is granted a temp. commn. as Capt.; July 1.

(Three officers transfd. to Unemployed List.)

#### Memoranda.

(Then follow the names of 526 Cadets granted Hon. Commns. as Sec. Lieuts.)

Temp. Hon. Capt. J. C. Pape relinquishes his commn. on ceasing to be employed; May 1.

(Two officers transfd. to Unemployed List.)

The notification in the *Gazette* of July 11 concerning Lieut.-Col. J. A. Houston-Craufurd, C.M.G., C.B.E., is cancelled.

*London Gazette, July 29.*

The following temporary appointments are made: —

*Staff Officers, 3rd Class (Air). — Capt. V. A. Watson, A.M.; July 1. (Q.) — Sec. Lieut. F. A. Holmes; July 21 (from S.O. 2).*

The following temporary appointments are made: —

*Staff Officer, 1st Class (Air). — Lieut.-Col. R. P. Mills, M.C.; July 26.*

*Staff Officers, 3rd Class (P.). — Capt. F. L. J. Shirley, M.C.; April 27. Lieut. C. H. Tancred; May 27, vice Lieut. J. C. Watson.*

#### Flying Branch.

Major R. J. Bone, D.S.O., to be actg. Lieut.-Col. whilst employed as Lieut.-Col. (A. and S.); July 11.

Major (actg. Lieut.-Col.) E. R. C. Nanson, D.S.C., A.F.C., to be Major (S.) from Group Commander, and to relinquish actg. rank of Lieut.-Col.; July 16. Capt. R. Collishaw, D.S.O., D.S.C., D.F.C., to be acting Major while employed as Major (A.); June 13.

Lieut. W. Dancy to be graded for purposes of pay and allowances as Capt. while employed as Capt. (A.); May 1.

Sec. Lieuts. to be Lieuts. — E. K. W. Denton, P. J. Dowell; April 2, 1918. J. P. Jones; April 5, 1918. A. M. Diamant; May 13, 1918. E. M. Bates; May 17, 1918. (Hon. Capt.) H. J. Bullock; May 25, 1918. (Hon. Capt.) J. L. Wilmot; May 26, 1918. G. Robinson; May 27, 1918. H. J. Clark; May 31, 1918. G. M. Ashmore; June 8, 1918. J. B. Edwards; July 5, 1918. T. L. Lovell; July 16, 1918. B. P. Springett; July 17, 1918. J. Montgomery; Aug. 9, 1918. H. R. Gunner; Aug. 16, 1918. V. C. Hemsley; V. R. W. Owens; Sept. 1, 1918. H. J. Russell; Sept. 13, 1918. (Hon. Capt.) J. L. McLennan, M.C., T. Large; Sept. 23, 1918. E. O. Rutherford; Oct. 3, 1918. T. I. Phillips; Oct. 14, 1918. S. Tweedie; Oct. 16, 1918. W. F. Robertson; Oct. 20, 1918. J. R. Bartlett, M.C.; Oct. 23, 1918. F. E. L. Elliot, C. H. Harwood, G. S. Scott, J. Cafferkey; Oct. 26, 1918. R. J. Read, A. G. L. Sidwell; Nov. 1, 1918. (Hon. Capt.) A. W. Bloy; Nov. 7, 1918. G. R. Bradley; Nov. 10, 1918. F. L. Wheeldon, D.S.O.; Nov. 15, 1918. R. Boyle; Nov. 26, 1918. A. Hill, R. O. Goddard; Nov. 30, 1918. E. Bower, P. G. Clarabut, D. A. Hughes, J. H. Weatherill; Dec. 27, 1918. C. P. King; Jan. 16. D. C. Anderson, H. E. Ford; Jan. 19. L. G. Cunningham; Jan. 23. W. J. Goddard, W. J. Porter, D. Young; Feb. 1. S. Jones, C. S. P. Wallace; Feb. 16. E. Littlejohn; Feb. 22. H. R. Wright; Feb. 26. J. M. Barlow, J. D. Ford, A. F. Harris, L. F. Hodges, S. H. Spencer; March 1. C. V. A. Bucknall; March 12. N. T. North; March 13. S. A. Dismore; March 23. G. A. W. Garland; March 24. T. R. Adair, J. Atkinson, J. H. Mainwaring, C. Morris, G. H. Simister, F. J. Tilley, C. B. Wilson; March 26. V. G. Hinds, H. G. Jackson; March 27. J. Stewart; April 1. G. D. Wigley; April 7. P. Bushell, H. Goodwin, B. Reunert; April 11. W. Rowley-Redwood; April 12. S. Braby, F. J. Hunt, R. Pyne; April 25. G. D. Green; April 29. H. V. Alder, J. F. Blick, C. H. Brazier, V. Harmer, H. Hutchinson, J. W. Kembrey, R. F. Saunders, R. W. Silk, W. Tinsley; May 1. H. B. Harmsworth, L. Lovatt, A. Shepherd; May 4. B. H. Matthews; May 7. A. Beedie, E. A. C. Britton, W. B. Crouch, R. Henderson, C. N. James, W. S. Jenkins, D.F.C., W. H. Jordan, A. D. Kiernander, H. W. Matthews, T. H. Mercer, F. R. Oddy, T. G. Reed, J. W. Sole, A. G. B. Whittaker, L. A. Williamson; May 8. E. Grayson; May 13. R. C. Creamer, E. S. Farrand, J. F. Higgins, F. J. Letzer, O. H. P. Lloyd, W. Marsden, G. F. Shreve, J. M. Walker, F. L. Wraight, A. Wroot; May 17. H. E. B. Holden; May 22. W. R. Christian, F. W. Osman, W. Thornton; May 23. W. V. Pegden; May 24. W. Campbell; May 27. G. W. Armstrong, L. B. Duggan, J. C. Fitzmaurice, J. Glover, C. A. Morris, H. L. Page, J. B. Sanders, S. P. Scott; May 28. W. J. Cairns, C. C. A. Leppan, H. L. Lombard, G. L. Nicholson, H. S. Sandford; May 30. J. Marsden; June 2. F. Davison, T. C. Owen, G. Patterson, R. A. Pearce, D. L. Walker; June 6. A. Grimshaw; June 8. J. F. McNamara, E. T. Tregtown; June 13. L. A. S. Harris, T. M. Robertson, R. Walker; June 18. M. B. Lewis; June 19. H. P. Crabb, W. Kinghorn, H. Woodcock; June 20. R. V. Curtis; June 22. A. V. Street; June 30.

Sec. Lieut. (Hon. Lieut.) E. H. Colman to be Sec. Lieut. (Hon. Lieut.) (A.) from (T.); Jan. 2.

S. L. Cannon (Sec. Lieut., Bedford R.) is granted a temporary commn. as Sec. Lieut. (A. and S.); May 16, 1918 (substituted for the notification in the *Gazette* of June 21, 1918).

C. H. Brown (Lieut., King's L'pool R.) is granted a temp. commn. as Sec. Lieut. (O.); Oct. 16, 1918, and to be Hon. Lieut.

The following relinquish their commns. on ceasing to be employed: — Lieut. S. J. Lee (Lieut., Sask. R.); May 19. Lieut. H. A. D. Mackay (Lieut., Hants. R.); May 30. Sec. Lieut. (Hon. Lieut.) L. R. McKenna (Lieut., E. Ont. R.); July 3 (substituted for the notification in the *Gazette* of May 13). Capt. R. Hilton, M.C., D.F.C. (Capt., R.G.A.); July 7. Sec. Lieut. (Hon. Capt.) O. Greening (Capt., Can. Engineers), Lieut. W. Henderson (Lieut., Gordon Highrs.); July 8. Lieut. D. J. G. Webb (Lieut., D.C.L.I.); July 10. Sec. Lieut. (Hon. Lieut.) A. C. Pollard, M.C. (Lieut., Brit. Columbia R.); July 15. Lieut. J. H. Wensley (Lieut., Sask. R.); July 20.

Lieut. (actg. Capt.) D. H. D. Bickers is temporarily transferred to the unemployed list; Jan. 20.

(Then follow the names of 379 officers who are transfd. to the Unemployed List under various dates. We regret that, owing to pressure on our space, it is impossible to reprint this portion of the List. — Ed.)

The following Lieuts. relinquish their commns. on account of ill-health and are permitted to retain their rank: — W. F. Hiam (contracted on active service); April 7 (substituted for notification in *Gazette*, Jan. 10). G. M. Duncan (contracted on active service); June 12. K. B. Preston (caused by wounds); July 16. G. H. Nicholson (contracted on active service); July 18.

The following Lieuts. resign their commns. and are permitted to retain their rank: — H. R. S. Birkin (Lieut., R. War. R.), C. W. M. Whitlock (Lieut., Wilts. R.); July 30.

The following Sec. Lieuts. relinquish their commns. on account of ill-health and are permitted to retain their rank: — S. J. Bolitho; June 15 (substituted for notification in *Gazette*, July 1). W. L. Vennell; July 12 (substituted for notification in *Gazette*, April 11). F. E. King (contracted on active service); T. V. J. Nicholas; July 18.

The rank of Lieut. W. G. Millar is as now described, and not " Sec. Lieut. " as stated in *Gazette*, May 30.

The name of Lieut. C. W. E. Browse is as now described, and not " C. W. Browne, " as stated in *Gazette*, July 1.

The notification in *Gazette*, Feb. 28, concerning Lieut. J. E. G. Mosby, D.S.O., is cancelled.

The notification in *Gazette*, April 1, concerning Sec. Lieut. J. MacD. MacKinnon is cancelled.

The notification in *Gazette*, April 4, concerning Sec. Lieut. A. R. A. Millar is cancelled.

The notification in *Gazette*, April 4, concerning Sec. Lieut. L. F. Rowsell is cancelled.

The notification in *Gazette*, April 8, concerning Sec. Lieut. R. R. Parker is cancelled.

The notification in *Gazette*, April 11, concerning Sec. Lieut. R. S. Payne is cancelled.

The notification in *Gazette*, April 29, concerning Sec. Lieut. D. Morford is cancelled.

The notification in *Gazette*, June 6, concerning Sec. Lieut. A. A. Moir is cancelled.

The notification in *Gazette*, June 24, concerning Major F. E. Sandford, A.F.C., is cancelled.

The notification in *Gazette* of July 8, concerning Lieut. H. R. Owen is cancelled.

#### Administrative Branch.

Major R. B. B. Colmore, O.B.E., to be Major., from (S.O.); May 12.

Capt. J. A. M. Lang, O.B.E., to be Capt., from (S.O.); May 15.

Lieut. S. J. Stocks to be Lieut., from (S.O.); May 18.

Sec. Lieut. (Hon. Capt.) R. Alston to be Sec. Lieut. (Hon. Capt.), from (T.), and to be graded for the purpose of pay and allowances as Capt. whilst employed as P.T.O.; May 1.

Sec. Lieuts. to be Lieuts. — A. G. Buxton, F. W. Day (Hon. Capt.), W. C. Green, M.C., J. W. Harling, G. H. Heys, S. W. Lewis; April 2. S. F. R. Hulbert; April 17, 1918. G. E. Blake; June 15, 1918. J. B. Martin; Sept. 17, 1918. H. T. Evans; Oct. 10, 1918. T. Whitaker; Oct. 13, 1918. T. Gill; Oct. 15, 1918. W. Lee; Nov. 9, 1918. A. E. Holton; Nov. 30, 1918. G. Oliver; Jan. 31. G. Waugh; Feb. 2. S. R. Payne; Feb. 28. S. Sprenger; March 1. J. Pell; March 2. H. T. H. Copeland; March 4. R. R. Trout; March 7. H. G. Hooker, A. H. Redfern; March 26. J. A. Elliott; April 11. H. J. Payne; April 18. E. N. Allott; April 25. G. Dolley; May 8. K. Drago; May 11. R. J. Bright, E. A. Burridge; May 16. (Hon. Capt.) D. R. Thomas, H. West; May 17. H. Cooper, M.C., G. H. Blake, D.C.M.; May 21. A. J. Somers; June 3. G. R. La Cecilia; June 5.

Sec. Lieut. W. J. Collins to be graded for purposes of pay and allowances as Lieut. whilst employed as Lieut.; May 1.

Sec. Lieut. L. E. Pocock to be Sec. Lieut., from (A.); April 17.

The following Sec. Lieuts. (late Gen. List, R.F.C., on prob.) are confirmed in rank as Sec. Lieuts. — W. Lee; Nov. 8, 1918. Sec. Lieut. P. A. Stallard, March 4. (Substituted for the notification in *Gazette*, June 17). R. W. Hyde; June 11.

Sec. Lieut. H. T. Robinson is confirmed in his rank as Sec. Lieut.; Feb. 20.

The following relinquish their commns. on ceasing to be employed: — Lieut. H. Hemingway (Lieut., Middx. R.); Feb. 17. Sec. Lieut. L. J. Scott (R.A.O.C.); May 6. Lieut. R. H. S. Waley (Lieut., R.F.A.); May 24. Lieut. R. C. Johnyson-Hicks (Lieut., R. W. Surr. R.); May 30. Lieut. J. P. Sheridan (Lieut., L. N. Lancs. R.); July 2. Major R. M. R. Lamb, D.S.O. (Major, North'd. Fus.); July 4. Lieut. T. G. Beale (Lieut. Dn. Gds.). Lieut. R. T. Robbins (Lieut., Linc. R.); July 9.

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank: — J. R. Maloney (caused by wounds); Jan. 11 (substituted for notification in *Gazette*, Jan. 10). C. G. Merryweather; June 12. J. T. Andrew; July 14.

(Then follow the names of 49 officers who are transfd. to the Unemployed List under various dates.)

Sec. Lieut. W. H. Dibben relinquishes his commn. on account of ill-health and is permitted to retain his rank; July 16.

Sec. Lieut. B. J. Crewe (Oxf. and Bucks. L.I.) relinquishes his commn. on account of ill-health contracted on active service; July 23.

Sec. Lieut. N. F. Hoxie is dismissed the Service for absence without leave; Jan. 26.

The initials of Sec. Lieut. T. L. Price are as now described, and not " T. R. " as stated in *Gazette*, May 13.

The notification in *Gazette* of April 29, concerning Capt. (Hon. Major) (actg. Lieut.-Col.) H. B. Nutting is cancelled.

The notification in *Gazette* of May 2 concerning Sec. Lieut. (Hon. Lieut.) P. R. Cook is cancelled.

The notification in *Gazette*, May 30, concerning Lieut. A. R. Porter is cancelled.

The notification in *Gazette*, July 11, concerning Lieut. D. Miller is cancelled.

## Technical Branch.

Lieut. C. E. A. Moore to be actg. Capt. while employed as Capt., Grade (A), from Aug. 27, 1918, to April 30 (substd. for notification in *Gazette*, Oct. 11, 1918).

Lieut. H. Cooke-Smith to be graded for purposes of pay and allowances as Capt. while employed as Capt., Grade (A.); May 1.

Lieut. F. J. Cooke to be graded for purposes of pay and allowances as Capt. while employed as Capt., Grade (B.); from May 1 to June 30.

Lieut. G. W. M. Whitten relinquishes the grading for purposes of pay and allowances of Capt.; July 18.

Sec. Lieut. B. Cheeseman to be graded for pay and allowances as Lieut. while employed as Lieut., Grade (A.); May 1.

Sec. Lieuts. to be Lieuts. :—H. St. C. Roy, M.C.; April 2, 1918. D. Barron; June 12, 1918. P. H. Morrish; Nov. 9, 1918. E. S. Baker; Jan. 27. A. G. Ridgon; Feb. 28. N. B. Hemsley, M.B.E.; March 17. N. F. Burch; April 9. O. N. H. Watson, A. H. Scaife; April 23. W. E. Townsend; April 24. H. Davis; May 1. F. C. Lyne; May 3. C. G. Whitmore; May 4. G. H. J. Stein; May 26. J. G. Peacock; June 6. R. P. Graham, without pay and allowances prior to July 16, 1918. L. A. Sturrock, without pay and allowances, prior to June 16, 1918. (Hon. Capt.) C. Shears, without pay and allowances prior to July 1, 1918. H. H. Williams, without pay and allowances prior to Dec. 6, 1918; April 2, 1918. C. B. Dick-Cleland; April 5, 1918, without pay and allowances prior to Sept. 18, 1918. G. E. Bower April 6, 1918, without pay and allowances, prior to June 1, 1918. E. G. A. Jones; May 26, 1918, without pay and allowances prior to Aug. 1, 1918. J. Bullock; June 14, 1918, without pay and allowances, prior to July 1, 1918.

Sec. Lieuts. to be Lieuts. without pay and allowances of that rank:—D. D. Cormack, M.C., W. E. Cowie, E. H. Bramwell, H. V. Bevis, J. H. Ferguson, M.B.E., F. H. Jefferis, C. L. Labhart, H. D. Patterson, J. J. Page, M. R. Preece, H. S. Royfe, E. L. Rhodes (Hon. Major) A. H. W. Saunders-Knox-Gore; April 2. S. K. D'A. Ferrars; April 5, 1918. J. O. Cooper; April 12, 1918. A. H. Varian; June 2, 1918. C. B. Hudson; Sept. 10, 1918. E. C. Ponking; Sept. 14, 1918. W. H. Hoile; Jan. 12. J. D. Graham; Jan. 16. J. E. Kingham; Jan. 27. G. S. Crowther; Feb. 4. F. W. G. Ticehurst; Feb. 12. W. J. Harries; Feb. 24. H. J. Kibble; Feb. 28. L. F. W. Stone; Mar. 1. R. H. Nicol; Mar. 6. A. Bolton; Mar. 8. W. J. Cleasby; Mar. 12. M. J. Curtis, T. H. Maltby; Mar. 21. W. Massey; March 24. J. McKeown; April 8. A. R. Conder, C. H. Greenhouse, H. B. Long, G. Spurgin; April 19. B. Freeman; April 23. M. L. Dobbin; April 25. N. D. Bryce; April 30. G. C. Kemp; May 1. E. A. Gater; May 3. F. A. Bracher; May 11. W. A. Mansfield, A. E. Fallon; May 12. W. E. Critchley, G. Johnson, J. A. Leonard, A. Ward; May 13. H. W. Baylis, C. W. Bentley, H. J. Dann, E. T. W. Nockold, H. G. Smith, B. P. K. Walsh; May 16. A. L. Flaws, E. M. Ling, C. Mansfield, E. V. Solomon; May 26. F. Simpson, A. C. Tinkler, F. C. Worton; May 28. A. B. West, A. Wilkins; June 1. A. V. Baker, H. Berridge, W. F. Chauncey, H. S. Given, V. S. Lord, W. R. Tuddenham, L. H. Vernon; June 3. H. Barnes-Moss; June 8. W. R. Day, J. E. C. Hammond June 10. E. Whit-

more; June 12. E. L. Hocking; June 15. A. M. R. Nicholson; June 18. C. Capley; June 21. A. H. Knight; June 27. F. S. Hetherington, F. W. Martyn; June 28.

Sec. Lieut. A. W. Whistlecroft to be Sec. Lieut., Grade (A.) from (Ad.) Dec. 1, 1918 (substituted for notification in *Gazette* of Feb. 4).

Sec. Lieut. (Hon. Lieut.) F. McGuffie to be Sec. Lieut. (Hon. Lieut.) from (S.O.); March 5.

Sec. Lieut. (Hon. Capt.) W. C. Green, M.C., to be Sec. Lieut. (Hon. Capt.), Grade (B.), from (Ad.); July 1.

Sec. Lieut. F. A. Osborn to be Sec. Lieut., Grade (B) from (Ad.); June 3.

Sec. Lieut. S. E. White to be Sec. Lieut., from (Unemployed List); July 14, with precedence next below Sec. Lieut. J. S. Viner.

Lieut.-Col. Lord A. R. Innes-Ker, D.S.O. (Capt., R. H. Gds.), relinquishes his commn. on ceasing to be employed.

(Then follow the names of 30 officers who are transfd. to the Unemployed List under various dates.)

Lieut. (Hon. Capt.) C. S. Willmott relinquishes his commn. on account of ill-health, and is permitted to retain the rank of Capt.; June 10 (substituted for the notification in the *Gazette* of June 27).

Sec. Lieut. F. Boultham relinquishes his commn. on account of ill-health, and is permitted to retain his rank; May 14.

The notification in the *Gazette* of July 22 concerning Sec. Lieut. S. King-Smith is cancelled.

## Medical Branch

Major E. M. W. Hearn (Lieut.-Commander, R.N.) relinquishes his commn. on ceasing to be employed; May 30.

The rank of Lieut.-Col. H. Pritchard is as now described, and not Major, as stated in the *Gazette* of July 4.

(Three officers transfd. to Unemployed List.)

## Memoranda.

Lieut. J. W. Harling to be Hon. Capt.; Sept. 1, 1918.

Sec. Lieuts. to be Lieuts. :—H. K. Fairbrother; Sept. 9, 1918. A. E. Hale Mar. 16. H. F. Webb; Mar. 21.

(Then follow the names of 150 Cadets granted Hon. Commsns. as Sec. Lieuts. Temp. Hon. Lieut. G. A. Hopper relinquishes his commn. on ceasing to be employed; July 16.)

(Two officers transfd. to Unemployed List.)

## Dental Branch

(One officer transfd. to Unemployed List.)

Capt. H. A. Foldham (Lieut., North'd. Fus.) resigns his commn. and is granted the rank of Major; July 30.

The notification in the *Gazette* of July 8 concerning Major H. A. Moore, C.B.E., M.C., is cancelled.

The notification in the *Gazette* of July 8 concerning 522564 Cdt. E. B. Saunders is cancelled.

The notification in the *Gazette* of July 18 concerning Lieut. J. E. Pike is cancelled.

## London Gazette, August 1.

The attention of the officers named in this *Gazette* is directed to the Air Ministry Weekly Order, now in course of issue, relating to the grant of permanent commissions, and to the new rates and conditions of pay and other emoluments.

The following are granted permanent commissions in the R.A.F. in the ranks stated (Aug. 1):—

## Major-Generals.

Sir H. M. Trenchard, K.C.B., D.S.O.  
Sir G. M. Paine, K.C.B., M.V.O.  
Sir J. M. Salmond, K.C.B., C.M.G., C.V.O., D.S.O.  
J. F. A. Higgins, C.B., D.S.O., A.F.C.  
E. L. Ellington, C.M.G.  
Sir W. G. H. Salmond, K.C.M.G., C.B., D.S.O.

## Colonels.

A. V. Vyvyan, C.B., D.S.O.; P. W. Game, C.B., D.S.O.; O. Swann, C.B., C.B.E.; F. R. Scarlett, C.B., D.S.O.; C. L. Lambe, C.B., C.M.G., D.S.O.; J. M. Steel, C.M.G., C.B.E.; C. A. H. Longcroft, C.M.G., D.S.O., A.F.C.; T. I. Webb-Bowen, C.B., C.M.G.; L. E. O. Charlton, C.B., C.M.G., D.S.O.; D. le G. Pitcher, C.M.G., D.S.O.; R. M. Groves, C.B., D.S.O., A.F.C.; E. A. D. Masterman, C.M.G., C.B.E., A.F.C.; J. H. W. Becke, C.M.G., D.S.O.; P. L. Gerrard, C.M.G., D.S.O.; H. P. Smyth-Osbourne, C.M.G.; F. C. Halahan, C.M.G., D.S.O., M.V.O.; P. R. C. Groves, C.M.G., D.S.O.

## Lieutenant-Colonels.

C. R. Samson, C.M.G., D.S.O., A.F.C.; R. H. Clark-Hall, D.S.O.; T. C. R. Higgins, C.M.G.; A. M. Longmore, D.S.O.; I. M. Bonham-Carter, O.B.E.; P. L. W. Herbert, C.M.G.; J. G. Hearson, C.B., D.S.O.; E. R. Ludlow-Hewitt, C.M.G., D.S.O., M.C.; U. J. D. Bourke, C.M.G.; C. L. N. Newall, C.M.G., A.M.; A. E. Borton, C.M.G., D.S.O., A.F.C.; A. Fletcher, C.M.G., C.B.E., M.C.; R. Gordon, C.M.G., D.S.O.; C. R. J. Randall, C.B.E.; A. G. Board, C.M.G., D.S.O.; F. V. Holt, C.M.G., D.S.O.; K. G. Brooke, C.M.G.; P. B. Joubert de la Ferte, C.M.G., D.S.O.; W. R. Freeman, D.S.O., M.C.; N. D. K. MacEwen, C.M.G., D.S.O.; P. H. L. Playfair, M.C.; R. P. Mills, M.C.; I. T. Courtney, O.B.E.; G. B. Hynes, D.S.O.; Hon. J. D. Boyle, D.S.O.; P. K. Wise, C.M.G., D.S.O.; W. MacNeece, D.S.O., D.F.C.; A. E. Burdett, D.S.O.; W. G. S. Mitchell, D.S.O., M.C.; H. le M. Brock, D.S.O.; G. F. Pretzman, D.S.O., O.B.E.; E. F. Briggs, D.S.O.; C. E. Risk, D.S.O.; C. I. Courtney, C.B.E., D.S.O.; C. E. H. Rathborne, D.S.O.; A. W. Bigsworth, C.M.G., D.S.O.; R. P. Ross, D.S.O., S. A. Hebdon; G. I. Carmichael, D.S.O.; J. A. Chamier, C.M.G., D.S.O., O.B.E.; L. W. B. Rees, V.C., M.C., A.F.C.; C. R. S. Bradley, O.B.E.; N. J. Gill, C.B.E., M.C.; H. A. Williamson, C.M.G.; D. A. Oliver, D.S.O.; F. W. Bowhill, D.S.O.; E. D. M. Robertson, D.F.C.; J. T. Cull, D.S.O.; H. M. Cave-Browne-Cave, D.S.O., D.F.C.; A. L. Godman, C.M.G., D.S.O.; A. J. L. Scott, M.C., A.F.C.; A. V. Bettington, C.M.G.; J. H. A. Landon, D.S.O.; R. A. Cooper, D.S.O.; R. G. Cherry, M.C., J. C. Halahan, C.B.E.; A. E. Cairnes, D.S.O.; C. D. Breeze, A.F.C.; R. G. D. Small; C. S. Burnett, D.S.O.; N. Goldsmith; J. B. Bowen, O.B.E.; W. H. C. Mansfield, D.S.O.; A. H. Measures, O.B.E.; M. Spicer; R. G. Blomfield, D.S.O.; S. Grant-Dalton, D.S.O.; C. G. S. Gould; P. F. M. Fellowes, D.S.O.; W. H. Primrose, D.F.C.; C. F. Kilner, D.S.O.; H. R. Busteed, O.B.E., A.F.C.; I. G. V. Fowler, A.F.C.; M. G. Christie, C.M.G., D.S.O., M.C.; H. Blackburn; J. Mead, M.C.; R. C. M. Pink; G. C. St. P. de Dombasle, O.B.E.; R. A. Bradley, C.M.G.

## Majors.

L. A. Strange, D.S.O., M.C., D.F.C. (A.); A. S. Barratt, C.M.G., M.C. (A.); J. R. Smyth-Pigott, D.S.O. (A.); L. I. Allen, (S.O.); J. W. Cruikshank, O.B.E. (T.); H. A. Van Ryneveld, D.S.O., M.C. (A.); A. Shekleton, D.S.O. (A.); E. L. Gossage, D.S.O., M.C. (S.O.); J. E. A. Baldwin, D.S.O. (A.); C. H. K. Edmonds, D.S.O., O.B.E. (A.); G. R. Bromet, D.S.O., O.B.E. (S.O.); F. E. T. Hewlett, D.S.O., O.B.E. (A. and S.); R. E. C.

*Captains*

A. A. B. Thomson, M.C. (S.); W. B. Hargrave (A.); J. R. Howett (A.); R. S. Maxwell, M.C., D.F.C. (A.); G. Allen (A.); E. M. Pollard (A.); H. V. Champion de Crespiigny, M.C., D.F.C. (A.); C. H. Dixon, M.C., D.F.C. (A.); A. S. Morris, O.B.E. (T.); E. R. Pretyman (A.); I. T. Lloyd (A.); E. J. Hodsell (S.); A. J. Capel (A.); J. R. McCrindle, O.B.E., M.C. (A.); H. Cockerell (T.); O. G. W. G. Lywood (T.); J. C. Russell (A.); C. E. H. Medhurst, O.B.E., M.C. (A.); A. R. Arnold, D.S.O., D.F.C. (A. and S.); C. S. MacNab (S.O.); R. H. Kershaw (A. and S.); H. Stewart (S.); N. S. Douglas (Ad.); J. E. B. Maclean, D.S.C. (S.); A. S. Redfern (A.); W. Thomas, M.C. (T.); R. Collishaw, D.S.O., D.S.C., D.F.C. (A.); C. T. McLaren, O.B.E. (A.); F. P. Holliday, D.S.O., M.C. (A.); E. J. L. W. Gilchrist, M.C., D.F.C. (A.); H. E. F. Wyncoll, M.C. (T.); R. Grahame, D.S.O., D.S.C., D.F.C. (S.); C. H. C. Smith, D.S.C. (A. and S.); D. S. Jillings, M.C. (T.); V. A. H. Robeson, M.C. (A.); G. H. Bowman, D.S.O., M.C., D.F.C. (A.); C. G. Burge, O.B.E. (A.); N. B. Tomlinson (T.); H. S. Powell, M.C. (A.); W. G. P. Young, O.B.E. (S.O.); A. H. Stradling (S.O.); L. Auker, O.B.E. (T.); C. A. Ridley, D.S.O., M.C. (A.); F. W. H. Lerwill (T.); R. B. Munday, D.S.C. (A.); G. C. Pirie, M.C. (A.); J. H. D'Albacia, D.S.O. (A.); R. J. O. Compston, D.S.C., D.F.C. (A.); G. Somers-Clarke (T.); C. F. Gordon, O.B.E., M.C. (O.); C. E. Wardle, (S.O.); E. H. Longridge (S.O.); H. W. Stratton (Ad.); D. S. K. Crosbie (A.); T. L. Stevens (Ad.); W. R. Read, M.C., A.F.C. (A.); G. T. Porter (A.); H. L. Reilly, D.S.O. (A.); C. C. Darley (A.); T. G. Bowler (Ad.); E. O. Grenfell, M.C., A.F.C. (A.); E. C. Perrin, O.B.E. (S.O.); F. E. Hellyer (Ad.); D. R. Hanlon (A.); C. E. H. James, M.C. (A.); B. D. S. Tuke (S.O.); A. McR. Moffatt (S.O.); S. C. W. Smith (T.); J. W. Woodhouse, D.S.O., M.C. (A.); M. Henderson, D.S.O. (A.); E. A. Jackson (T.); W. J. B. Curtis, O.B.E. (T.); E. L. Oliver, M.C. (Ad.); C. H. Elliott-Smith, M.C. (A.); R. B. C. M. T. de Poix (S.O.); E. A. Beulah (S.O.); L. H. T. Sloan (A.); W. W. Hart, M.B.E. (T.); E. B. Beau- man (A. and S.); E. R. Whitehouse (S.O.); G. B. Dacre, D.S.O. (S.); R. C. L. Holme, M.C. (A.); E. R. Vaisey (A.); F. W. Trott, O.B.E., M.C. (S.O.); F. H. Songhurst, M.B.E. (T.); J. H. Simpson (A.); C. J. W. Darwin, D.S.O. (A.); A. C. Bolton, M.C. (S.O.); P. G. Scott (A.); C. B. Cooke (A.); G. W. Roberts, M.C. (A.); G. H. Hall, A.F.C. (A.); C. Porri (T.); R. B. Mansell (A.); F. L. Robinson, D.S.O., M.C. (A.); L. J. Bayly, M.C. (A.); C. E. H. C. Macpherson (A.); P. B. Hunter (T.); C. Cooper (A.); R. C. Hard- staff (A.); W. D. Budgen, G.B.E. (S.O.); J. J. Breen (S.O.); G. C. Bailey, D.S.O. (A.); A. Fitz, R. P. H. Somerset-Leeke (T.); P. Huskinson, M.C. (A.); A. S. Ellerton (S.O.); A. P. V. Daly (A.); C. E. W. Foster (A.); D. Iron (S.O.); A. S. Maskell (A.); C. H. G. Woolven, M.C. (Ad.); E. de C. Hallifax, D.S.C. (A. and S.); F. P. Don (S.O.); R. S. McClintock, M.C. (A.); S. N. Cole (A.); A. T. Williams (A.); L. G. S. Payne, M.C. (A.); B. E. Baker, D.S.O., M.C., A.F.C. (A.); A. W. Bird, D.S.O. (A.); C. H. Hayward, (A.); E. D. Atkinson, D.F.C., A.F.C. (A.); G. L. Hunting (T.); C. W. Mackey (A.); A. N. Benge (A.); J. C. M. Hay (Ad.); C. R. Cox, A.F.C. (A.); H. G. Hutchinson (S.O.); H. W. G. Jones, M.C. (A.); R. Whitaker, M.B.E. (S.O.); G. H. A. Hawkins (S.O.); J. F. Gordon, D.F.C. (A.); C. J. Q. Brand, D.S.O., M.C., D.F.C. (A.); J. M. Robb, D.F.C. (A.); R. G. Mack (A.); R. S. Lucy (A.); T. H. McDowell (A.); W. E. Reason (T.); F. L. J. Shirley, M.C. (Ad.); N. H. Bottomley, A.F.C. (S.O.); E. B. Mason (A.); S. G. Frost, M.B.E. (T.); H. L. H. Owen, A.F.C. (A.); E. W. Havers (T.); J. Gilmour, D.S.O., M.C. (A.); M. L. Taylor (A.); P. E. M. Le Gallais, A.F.C. (A.); H. A. Tweedie, A.F.C. (S.O.); H. M. Probyn, D.S.O. (A.); E. B. Grenfell (A.); E. E. N. Burney, M.C. (A.); L. L. MacLean (A.); O. H. Frost, M.C. (S.O.); A. Hunter (T.); L. A. K. Butt (S.O.); G. H. Cock, M.C. (A.); L. C. Keeble (A.); F. W. Hudson (A.); D. F. Stevenson, D.S.O., M.C. (A.); F. G. Stammers, O.B.E. (S.O.); T. F. Hazel, D.S.O., M.C. (A.); D.F.C. (A.); R. M. Drummond, D.S.O., M.C. (A.); A. W. F. Glenny, M.C., D.F.C. (A.); A. G. Jones-Williams, M.C. (A.); A. C. Randall, D.F.C. (A.); A. P. M. Sanders (S.O.); L. E. Palmer (T.); P. F. Fullard, D.S.O., M.C. (A. and S.); R. A. Courtney, M.B.E. (T.); C. C. Durston (T.); G. E. Livock, D.F.C. (S.); A. F. F. Jacob, D.S.O. (A.); W. H. Dunn, D.S.C. (S.); M. A. Simpson (A. and S.); R. F. S. Leslie, D.S.C., D.F.C. (A. and S.); F. J. Linnell (A. and S.); C. J. Galpin, D.S.O. (A. and S.); C. L. Scott, D.S.C. (S.); H. G. R. Malet (A.); R. B. Maycock, O.B.E. (S.O.); L. D. McKeon (A.); W. B. Cushion (Ad.); J. L. Vachell, M.C. (A.); H. H. McI. Fraser (A.); W. P. Groves (T.); H. W. Woollett, D.S.O., M.C. (A.); F. E. P. Barrington (A.); J. Everidge, M.C. (A.); C. H. Darley, D.S.C., D.F.C. (A.); H. R. H. Prince Albert, K.G., Personal A.D.C. to H.M. the King (A.); D. Cloete, M.C. (A.); J. Leacroft, M.C. (A.); H. G. Smart (A.); J. K. Waugh, D.S.C. (S.); A. Durston (S.); G. J. C. Maxwell, M.C., D.F.C., A.F.C. (A.); A. L. Marfarlane (A.); C. S. Morice, M.C. (A.); G. M. Clarke (A.); E. R. Tempest, M.C., D.F.C. (A.); T. E. Salt, A.F.C. (A.); E. L. P. Morgan (Ad.); D. H. M. Carver, M.C., D.F.C. (A.); W. A. Skeate (A.); A. H. Whistler, D.S.O., D.F.C. (A.); E. H. Hooper (T.); J. S. T. Fall, D.S.C., A.F.C. (A.); G. R. A. Deacon, M.C. (A.); E. A. Fawcett (A.); K. R. Park, M.C. (T.); H. I. Hanmer, D.F.C. (S.O.); A. L. Gregory, M.B.E., M.C. (T.); F. Nuttall, M.C. (A.); R. T. Neville (T.); V. Buxton (S.O.); W. H. Clover (T.); L. J. MacLean, M.C. (A.); C. St. Noble (T.); H. M. K. Brown (A.); A. E. McKrever, D.S.O., M.C. (A.); H. A. Smith, M.C. (A.); J. V. Read, M.B.E. (T.); W. E. G. Bryant (S.O.); J. A. Stone (T.); T. C. Thomson (A.); A. Chapman (T.); L. I. Barker (A.); M. Keegan (T.); F. Workman, M.C. (A.); J. McG. Glen, M.C. (S.O.); W. H. Dolphin (T.); B. J. Silly, M.C., D.F.C. (A.); J. P. Angell (T.); F. O. Soden, D.F.C. (A.); L. M. Lilley, O.B.E. (T.); A. G. Bond, A.F.C. (A.); W. B. Lawson (A. and S.); E. B. Rice (A.); C. H. Awcock (T.); J. B. Fox, M.C. (A.); G. Donald, D.F.C. (A. and S.); J. P. Coleman, A.F.C. (A. and S.); W. R. Mackenzie, D.S.C. (Ad.); A. N. Gallehawk (A. and S.); F. W. Walker, D.S.C., A.F.C. (S.O.); H. S. Kerby, D.S.C., A.F.C. (A.); A. M. Waistell, D.S.C. (S.O.); N. W. Wadham (A.); E. O. Drudge, M.B.E. (T.); T. Gran (T.); E. V. Longinotto, A.F.C. (A.); P. S. Jackson-Taylor (T.); H. V. German (A. and S.); L. H. Slatter, D.S.C., D.F.C. (A.); R. M. Bayley, D.F.C. (A.); V. R. Gibbs, D.S.C. (A.); W. B. Gallaway (S.); F. N. Halsted, D.S.C. (A. and S.); T. E. B. Howe, A.F.C. (A.); D. G. Donald (A.); E. P. Hardman, D.F.C. (A.); W. S. Newton-Clare (Ad.); F. M. Rope (T.); G. H. Reid, D.F.C. (S.); S. Richardson, M.B.E. (Ad.); A. S. Cheshire, M.B.E. (T.); R. W. Dawes (Ad.); L. J. Killmayer, M.B.E. (S.O.); C. F. Rasmussen (S.O.); R. Young (T.); A. J. Long (T.); J. A. Sadler (A. and S.); H. A. J. Wilson (S.O.); S. Nixon (S.O.); G. M. T. Rouse (A.); E. G. Hopcraft, D.S.C. (A. and S.); R. J. Slade, D.S.C. (O.); E. J. Cuckney, D.S.C. (S.O.); A. H. Pearce, D.F.C. (S.); J. A. Glen, D.S.C. (A.); G. D. Nelson, D.S.C. (T.); E. O'D. Crean (S.O.); C. H. Keith (S.O.); B. A. Malet, D.F.C. (O.); M. O. F. England (O.); H. Leedham (T.); A. G. Bishop, A.F.C. (A. and S.); L. H. Cockey (A.); H. Delarne, D.F.C. (A. and S.); J. W. B. Grigson, D.F.C. (S.); W. R. D. Ackland (A.); S. T. Freeman (A. and S.); C. M. Crowe, M.C., D.F.C. (A.); A. Ferris (S.O.); G. E. Wilson (A.).

*Lieutenants*

F. Fowler, D.S.C., A.F.C. (S.); D. Gilley, D.F.C. (A.); T. F. N. Gerrard, D.S.C. (A. and S.); F. N. Hudson, M.C. (A.); J. H. Norton, M.C., D.F.C. (A.); H. G. White (A.); C. R. Robbins, M.C., D.F.C. (A.); J. H. Butler (A.); D. S. Evans (A.); H. F. Bradley (T.); R. S. Sorley, D.S.C. (A.); H. de V. Leigh, D.F.C. (S.); R. G. St. John, D.S.C. (O.); E. B. C. Betts, D.S.C., D.F.C. (O.); F. L. Luxmoore (A.); H. V. Rowley (A.); C. F. Brewerton, D.S.C. (A.); G. W. R. Fane, D.S.C. (A. and S.); F. J. Bailey (S.); W. T. S. Williams, D.S.C. (S.O.); L. A. C. Stafford (T.); D. R. W. Thompson (O.); S. S. Benson, A.F.C. (S.); E. P. M. Davis, A.F.C., A.M. (A. and S.);

Lacey, A.F.C. (A.); H. Hackney (S.); R. W. Edwards (T.); G. J. Davies (T.); H. Norrington (T.); J. W. Jean, D.S.M. (T.); W. Liniker (T.); J. W. Hosking, M.B.E. (T.); C. Attrill, M.B.E. (T.).  
 R. L. Hartley (T.); C. F. Chinery (T.); E. H. Rundle (T.); C. H. Potts (T.); H. H. S. Scott, D.S.M. (T.); E. Whittlesea (T.); S. T. Littleton (T.); H. J. Brown (T.); P. Coyle (T.); J. Noonan, D.S.M. (T.); T. S. Jobling (T.); R. D. McE. Hart (T.); R. G. Gore (T.); A. P. White (T.); C. O. Towler (T.); C. E. Whinney (T.); H. W. St. John, D.F.C. (O.); W. A. Coryton (A.); A. G. Quinnell (Ad.); R. Pyne (A.); H. K. Goode, D.S.O. (A.); J. Bradbury (A.); D. A. Cox (O.); G. A. R. Muschamp (A.); H. G. McKechnie (T.); W. K. Rose (A. and S.); R. A. Whyte (A. and S.); A. E. Gooch (T.); F. A. Skoulding (T.); R. Jones, M.C. (A.); J. E. Kendrick, D.F.C. (O.); I. Whitford (A.); R. H. Haworth-Booth, D.F.C. (A.); J. A. G. Haslam, M.C. (D.F.C. (O.); J. S. Harrison (O.); E. G. Gaff (A.); V. Croome (A.); F. G. Prince (A.); J. A. Elliott (T.); O. G. Gregson (A.); C. A. Horn (O.); J. Blackford (A.); J. W. Lissett (A.); W. E. Dipple (A. and S.); H. E. Falkner (O.); F. T. Eades (O.); G. M. Lawson, M.C. (O.); D. S. Robertson (A.); W. S. Allen (T.); B. F. Deane (O.); J. V. Gascoyne, D.F.C. (A.); L. B. Duggan (A. and S.); J. Parsons (T.); H. J. Bradley (A. and S.); J. S. Nichol (O.); R. H. F. de V. S. Somerset (A. and S.); D. Wood (A.); G. W. Birkinshaw (A. and S.); E. Brewerton (A. and S.); G. McCormack (O.); G. P. H. Carter (A.); C. Walker (O.); K. L. Harris (A.); H. Dawes, M.B.E. (S.O.); S. C. Black (A.); R. J. Wilson (O.); J. Cafferkey (A.); M. C. Trench (O.); F. K. Damant (A.); F. J. Smith, M.C., M.M. (O.); C. A. Spence (A.); E. B. Green, M.C. (O.); S. J. Smetham (S.); P. N. Melius (O.); E. H. Searle (A. and S.); L. Smith (Ad.); A. G. Thackray (S.); C. S. Miller (O.); H. W. Pearson (A.); E. A. Blake (A.); B. A. Foord, M.C. (O.); W. H. Bowden (Ad.); A. G. Pearce (A.); J. C. Foden, A.F.C. (A.); C. B. Dick-Cleland (Ad.); L. H. I. Bell (A.); L. G. Maxton (A.); A. H. E. Lindop (O.); A. S. Thompson (A.); C. R. Fenton (Ad.); C. F. Falkenberg, D.F.C. (A.); R. W. Rayn (A.).

## Royal Air Force.

The following temporary appointment is made at the Air Ministry:—  
 Staff Officer, 1st Class (Air).—Lieut.-Col. A. S. Barratt, C.M.G., M.C.; July 18. Vice Lieut.-Col. G. F. Pretyman, D.S.O., O.B.E.

The following temporary appointments are made:—  
 Brigadier-General Staff.—Lieut.-Col. C. S. Burnett, C.B.E., D.S.O.; June 18, and to be actg. Brig.-Gen. while so employed; vice Lieut.-Col. (actg. Brig.-Gen.) P. L. W. Herbert, C.M.G.

Staff Officer, 1st Class.—(P.).—Lieut.-Col. R. C. M. Pink; July 25.  
 Staff Officer, 2nd Class.—(T.).—Maj. W. R. Bruce; Feb. 22.  
 Staff Officer, 3rd Class.—(Q.).—Capt. G. L. Hunting; Feb. 25.  
 Staff Officer, 4th Class (Air).—1st Grade.—Lieut. R. J. Slade; May 27.

## Flying Branch.

Lieut.-Col. G. F. Pretyman, D.S.O., O.B.E., to be Lieut.-Col. (A.), from (S.O.) July 18.

Maj. F. K. Haskins, D.S.C., to be graded for purposes of pay and allowances, as Lieut.-Col. while employed as Lieut.-Col. (A.) from May 1 to May 25.

Maj. W. Pennefather to be Maj. (Airship) from (S.O.); May 1.

Capt. R. S. Smith, to be graded for purposes of pay and allowances as Maj. while employed as Maj. (K.B.); July 20.

H. R. H. Prince Albert, K.G., Personal A.D.C. to His Majesty the King, to be Capt. (A.) from (Ad.); July 31.

Lieut. P. D. Baker to be graded for purposes of pay and allowances as Capt., whilst employed as Capt. (A.); May 1.

Lieuts. (O.) to be Lieuts. (A.)—G. F. Fry, C. W. H. Moller; May 20.

Lieut. D. F. Fox to be Lieut. (A.), from (S.O.); July 21.

Sec. Lieuts. to be Lieuts. —F. D. Kilby; Feb. 1. A. G. Dickinson; June 7.

Sec. Lieut. G. R. Hunter to be Sec. Lieut. (A.), from (O.); July 9, 1918.

The following relinquish their commissions on ceasing to be employed:—

Lieut. S. B. Kington (Lieut., W. Rid. R.); Feb. 4. Lieut. W. P. Harris (Lieut., W. Ont. R.); March 10. Lieut. S. G. Harman (Lieut., Welsh R.); May 6. Sec. Lieut. T. H. Barry (Lieut., R.G.A.); May 23. Lieut. R. A. P. Johns (Lieut., Hussars); May 31. Capt. C. L. Bath (Lieut., Temp. Capt., Can. M.G.C.); June 12. Sec. Lieut. (Hon. Lieut. W. P. A. Robinson (Lieut., R.F.A.); June 21. Lieut.-Col. F. A. Wanklyn, M.C. (Maj., R.A.); June 24. Lieut. W. H. Kilby (Lieut., Manitoba R.); July 9. Lieut. L. Dodson, M.C. (Lieut., S. Staffs R.); July 11. Lieut. G. Fielden (Lieut., Hussars); July 30. Lieut. W. R. Curtis is temporarily transfd. to the unempd. list; May 22.

(Then follow the names of 162 officers who are transferred to the Unemployed List under various dates. We regret that owing to pressure on our space it is impossible to reprint this portion of the list.)

The following relinquish their commissions on account of ill-health, and are permitted to retain their rank:—Capt. J. W. Somers (contracted on active service); July 21. Lieut. H. Fenton (contracted on active service), Lieut. E. L. H. Macleod (caused by wounds); July 22. Lieut. C. C. G. Girvan (caused by wounds); July 23. Lieut. M. Andrews (contracted on active service); July 30. (substituted for the notification in *Gazette* March 28). Sec. Lieut. F. T. Mollard; May 23 (substituted for the notification in *Gazette* May 9); Sec. Lieut. G. R. Newton-Bridle (contracted on active service); July 20 (substituted for the notification in *Gazette* April 8); Sec. Lieut. S. C. Ridges; July 26.

Sec. Lieut. M. C. Burt relinquishes his commission on account of ill-health; July 10 (substituted for notification in *Gazette* of June 6).

The initials of Lieut. (actg. Capt.) E. C. Morris are as now described and not "E. E." as stated in *Gazette* of May 9.

The Christian names of Sec. Lieut. Edmund Bernard Saunders are as now described, and not "Edward Bernard," as stated in *Gazette* of Dec. 10, 1918.

The surname of Sec. Lieut. R. Kelley is as now described, and not "Kelly," as stated in *Gazette* of June 24.

The notification in *Gazette* of March 28 concerning Lieut. J. A. Anderson (Brit. Col. R.) is cancelled.

The notification in *Gazette* of April 4 concerning Lieut. I. A. Peers is cancelled.

The notification in *Gazette* of April 8 concerning Lieut. (Actg. Capt.) P. B. Pattison is cancelled.

The notification in *Gazette* of May 20 concerning Lieut. N. B. Arbuthnot is cancelled. The notification in *Gazette* of May 27 to stand.

The notification in *Gazette* of May 27 concerning Sec. Lieut. (Hon. Lieut.) W. Cooke is cancelled.



The notification in *Gazette* of July 1 concerning Lieut. C. Miller is cancelled. The notification in *Gazette* of July 8 concerning Sec. Lieut. R. J. Palmer, is cancelled.

## Administrative Branch.

Majs. to be Majs., from (S.O.):—R. Honey; July 9. H. E. Day, D.S.O. M.V.O.; July 21.

To be actg. Majs. whilst employed as Majs.:—Capt. J. P. H. Hayes, Sec. Lieut. (Hou. Capt.) C. Harvey; May 1.

Capt. to be Capt. :—G. B. McClure, O.B.E., from (S.O.); July 9. H. S. Edgar, from (T.); July 16. A. W. Crombie, from (T.); July 21.

Lieut. E. P. Manson to be graded for purposes of pay and allowances as Capt. whilst employed as Capt., from May 1 to July 1.

Sec. Lieut. (Hon. Lieut.) A. G. Horlock to be Sec. Lieut. (Hon. Lieut.) from (O.), and to be actg. Lieut. whilst employed, as Lieut., from May 30, 1918, to April 30.

Sec. Lieut. F. C. Matten to be Sec. Lieut. from (T.); Jan. 1.

P.F.O. S. S. Russell (late R.N.A.S.) is granted a temp. commn. as Sec. Lieut.; Sept. 7, 1918.

The following are granted temporary commissions as Sec. Lieuts.:—P. A. H. Anderson; July 28. B. F. Elliott; July 30.

The following relinquish their commissions on ceasing to be employed:—Capt. R. J. H. Purcell (Capt., K.R.R.C.); Feb. 27. Sec. Lieut. (Hon. Lieut.) G. H. P. Whithfield (Lieut., R. Irish Rifles); April 1. Lieut. P. L. Hogan (Lieut., L'pool. R.); May 28. Sec. Lieut. (Hon. Lieut.) N. F. Penruddocke (Capt., R.A.S.C.); July 11. Lieut. P. H. Drake-Brockman (Lieut. E., Surrey R.); July 15.

(Then follow the names of 29 officers transferred to the Unemployed List.)

The following Lieutenants relinquish their commissions on account of ill-health, and are permitted to retain their rank:—I. Curlewis, M.C. (caused by wounds), C. D. Taylor (contracted on active service); July 22.

Sec. Lieut. H. C. Thomas relinquishes his commission on account of ill-health and is permitted to retain his rank; July 22.

Sec. Lieut. S. V. Daley to take rank and precedence as if his appointment as Sec. Lieut. bore date May 1.

The notification in *Gazette* June 6 concerning Sec. Lieut. F. B. Morris is cancelled.

The notification in *Gazette* June 17 concerning Lieut. R. T. Kelly is cancelled.

The notification in *Gazette* July 11 concerning Lieut. J. T. Wright (Lieut. R.N.) is cancelled.

The notification in *Gazette* July 15 concerning Capt. G. A. Brown is cancelled.

## Technical Branch.

Maj. V. C. Richmond, O.B.E., to be actg. Lieut.-Col. while employed as Lieut.-Col., Grade (A.) (from Aug. 1, 1918, to March 31).

Capt. E. P. Smith to be actg. Maj. while employed as Maj., Grade (A.) (from Aug. 1, 1918, to Feb. 27).

Capt. to be graded for purposes of pay and allowances as Majs. while employed as Majs., Grade (A.):—A. K. Kendal, W. W. Tullis; May 1.

Capt. P. D. Robertson, A.M., to be Capt., Grade (A.), from (A.); April 17.

To be actg. Capt. while employed as Capt., Grade (B.):—Sec. Lieut. E. P. Dempster; from April 1, 1918, to April 30 (substd. for notification in *Gazette* April 30, 1918); Lieut. A. B. Macintosh (from Jan. 27 to April 30).

Lieut. S. W. Davis to be graded for purposes of pay and allowances as Capt. while employed as Capt., Grade (A.); May 1.

Lieut. A. S. Clark to be Lieut., Grade (A.), from (A.); Dec. 31, 1918.

Sec. Lieut. M. Sheriff, D.C.M., to be Lieut.; Feb. 30.

Sec. Lieuts. to be actg. Lieuts. while employed as Lieuts., Grade (A.), from Aug. 1, 1918, to March 31:—C. Dollery, T. F. Emms.

Sec. Lieut. (Hon. Lieut.) L. A. Sturrock (Lieut., I.A.R.O.) relinquishes his commission on reversion to I.A.R.O.; Aug. 1.

The following relinquish their commissions on ceasing to be employed:—Lieut. C. B. Carr (Lieut., Kent Cyclist Batt.); June 20, 1918. Lieut. T. S. Griffiths (Lieut., R. Welsh Fus.); June 26. Lieut. C. H. Knight (Dorset R.); July 3. Sec. Lieut. (Hon. Lieut.) P. Anderson (Lieut. (T. Capt.), A. and S. Higbys.); July 9.

(Then follow the names of 35 officers transferred to Unemployed List.)

Lieut. C. W. Ware relinquishes his commission on account of ill-health, and is permitted to retain his rank; July 29. (Substituted for notification in *Gazette* April 15.)

Sec. Lieut. C. A. S. Brittenden relinquishes his commission on account of ill-health, and is permitted to retain his rank; July 22.

The notification in *Gazette* July 18 concerning Sec. Lieut. (actg. Capt.) E. P. Dampier is cancelled.

The notification in *Gazette* May 23 concerning Sec. Lieut. J. H. Glew is cancelled.

## Medical Branch.

Transferred to unemployed list:—Capt. J. L. Whatley; Feb. 29. Capt. H. M. Holt; April 13.

## Memoranda.

The following are granted the acting rank stated against their names:—

Maj. A. H. C. Kearsey, D.S.O., to be actg. Lieut.-Col.; Capt. H. I. Hanmer, D.F.C., to be actg. Maj.; Capt. A. H. S. Baker to be actg. Maj.; Capt. C. C. Treatt to be actg. Maj.; Lieut. K. A. C. Creswell, M.B.E. to be actg. Capt.; May 1.

Lieut. C. H. Tancred to be actg. Capt.; May 27.

(Then follow the names of 60 Overseas Cadets who are granted temporary commissions as Sec. Lieuts. with effect from Feb. 15 and relinquish such commissions, with permission to retain the rank from the day following the standardised voyage in the case of those claiming immediate repatriation and from the day following demobilisation in England in all other cases.)

(Then follow the names of 130 Cadets granted Hon. Commissions as Sec. Lieut.)

Maj.-Gen. Sir F. H. Sykes, K.C.B., C.M.G., retires on ret. pay; April 1.

Capt. E. G. Knox (Aus. Flying Corps) relinquishes his temp. supplementary commission on ceasing to be employed; July 23.

The following relinquish their commissions on ceasing to be employed:—Lieut.-Col. R. J. Armes, C.M.G. (Maj., (Bt.-Col.), N. Staffs. R.); May 25; Maj. J. St. A. King (Maj., Indian Army); July 7; Temp. Hon. Lieut. H. R. Tidswell; July 31.

Transferred to unemployed list:—Maj. G. P. Myers, from (S.O.); April 11. Lieut.-Col. R. H. Mulock, D.S.O.; May 16. Lieut. H. Hooper, from (S.O.); June 11. Capt. A. E. Illingworth, from (S.O.); July 7.



from the churches of Notre Dame and St. Chapelle in Paris are again being placed in position.

They were removed to a place of safety when Hun aeroplanes and Big Bertha were so attentive to Paris, and yellow oiled silk did duty for them.

## Lieut. Nungessor's New Post

LIEUT. NUNGESSOR, the famous French ace, who is shortly to be demobilised, will, according to *Les Ecoutes*, become the editor of *Eve*, a women's magazine.

## AVIATION IN PARLIAMENT

### R.A.F. Weekly Half-holiday

Mr. WATERSON asked the Under-Secretary of State to the Air Ministry why it is found impracticable to give men at Warsash, Royal Air Force, the half-day on Wednesday in accordance with Air Ministry weekly orders; whether men can only leave the camp every other day, as they are on fire picket alternate days; and who is the camp commandant responsible.

Major-General Seely: The men at Warsash are granted leave from camp on an average of three days out of four, including night leave. There is no Air Ministry weekly order to the effect suggested in the question, but under the arrangements in force at Warsash the men get two free Wednesday afternoons out of three.

### Store Buildings, Regent's Park

Sir WILLIAM PEARCE asked the Under-Secretary of State to the Air Ministry when he will be in a position to notify the Disposals Board of the Ministry of Munitions that the air store buildings in Regent's Park are surplus to his requirements?

Major-General Seely: September 1 has been fixed as the date by which the standard stocks for the Royal Air Force will all be removed from Regent's Park and the buildings handed over to the Ministry of Munitions; and every endeavour will be made to work to that date.

### Pay of R.A.F. Technical Officers

LIEUT.-COL. SIR F. HALL on July 21 asked the Under-Secretary of State to the Air Ministry what amount of technical pay, if any, it has been decided to award to technical officers in Class A of the Royal Air Force; whether the same is to be retrospective from September 1, 1918, and will include technical officers demobilised before the decision has been arrived at; and, if so, whether an officer who would thus be entitled to additional pay can claim the same together with gratuity based on the larger amount of pay?

Maj.-Gen. Seely: As regards the future, the pay of officers of all branches, flying, technical and administrative, will, as I have already indicated, be uniform. As regards the past, the amount of technical pay which has been awarded to officers graded category "A" of the Technical Branch has been according to rank, viz.:

Second Lieutenant	2s. a day.
Lieutenant	3s. a day.
Captain	4s. a day.
Major	6s. 6d. a day.

The Air Force Agents have been instructed to issue retrospectively from April 1, 1918, or from the date of transfer or appointment to the Technical Branch, if more recent, to those officers who have now been so graded. This will include officers who have been demobilised. Gratuity will not be affected, as it is not calculated upon technical pay.

### Norman Thompson Flight Company

Mr. MACQUISTEN asked the Under-Secretary of State to the Air Ministry whether he will now answer the question whether an urgent letter from Mr. Norman Thompson, dated July 20, 1918, addressed to the Air Minister, asking him to redress the situation created by the actions of the Admiralty and other Government Departments, though formally acknowledged, has never been answered; and, if so, what explanation can be given?

Maj.-Gen. Seely: Mr. Norman Thompson's letter of July 20, 1918, was acknowledged on July 22 of last year on behalf of Lord Weir, to whom the letter was addressed, and Mr. Thompson was informed that as the matter was one of aircraft production it has been forwarded to the Director-General of Aircraft Production, Ministry of Munitions.

Mr. Macquisten asked the Parliamentary Secretary to the Ministry of Munitions whether a member of the Contract Claims Department of the Ministry of Munitions, acting for the Lubbock Committee of the Treasury, made a recommendation to the Aircraft Finance Department of the Ministry of Munitions to purchase Messrs. Cox and Co.'s debenture in the Norman Thompson Flight Co. and re-vest the control of the company in Mr. Norman Thompson and his co-directors; why the Government gave orders to the receiver after neglecting to do so to the Norman Thompson Co.; and whether it is an established custom or rule of the Treasury not to give orders to a receiver?

Mr. James Hope: The answer to the first part of the question is in the negative. As to the second part, it was only after the appointment of a receiver that a decision was reached as to the design of the flying boat in question. The Treasury do not issue any orders in a case of this sort. During the War, however, the Ministry of Munitions sometimes gave orders to a receiver in cases where there was a reasonable prospect of obtaining supplies which were urgently needed.

### Aerodrome at Flookborough

Mr. TYSON WILSON asked the Secretary of State for War whether he is aware that the construction of a large aerodrome was commenced at Flookborough during the War; that railway sidings were laid down and workmen's huts built, but that the same was discontinued owing to the then shortage of steel for constructional purposes; and whether he will consider the advisability of reconsidering this matter with a view to affording Messrs. Vickers, of Barrow, an opportunity of continuing to cater for this trade?

Major-General SEELY: The question is for the Admiralty, and perhaps the hon. Member will address that department accordingly.

### Cypress Aeroplanes Construction

Mr. REMER, on July 23, asked the Under-Secretary of State to the Air Ministry whether he can now make any further statement as to the serious losses caused in his Department by the sanction of the use of cypress on aeroplanes; whether he has been able to establish the blame for this loss, and whether he is now in a position to make a statement as to his decision to strengthen his advisory committee with practical expert opinion in order to avoid such blunders in future?

Major-General SEELY: With regard to the first two parts of the question, I would refer my hon. friend to the answers given to him on the 1st, 21st, and 26th May, and 26th June. In accordance with a suggestion made by my hon. friend the Conjoint Board of Scientific Societies were invited to consider the co-option of representatives of the National Federation of Sawmill Proprietors. The absence of the chairman of that body in America has involved delay, but he has now returned, and I will inform my hon. friend shortly what decision has been come to.

### Pension of Disabled Officers

Mr. W. NICHOLSON asked the Under-Secretary of State to the Air Ministry whether he is aware that Lieut. P. A. Baker, Royal Air Force, has been informed that he is to be gazetted out of the Air Forces; whether Lieut. Baker is still in hospital suffering from severe burns received in a crash in France in September, 1917; whether he has been marked for a further six months' treatment in hospital with daily surgical dressings; whether his pay, as lieutenant in the Royal Air Force, is 14s. per day, with free maintenance; whether, if gazetted out, he will receive pay at the rate of £175 per annum, less 4s. 6d. per day for maintenance; and whether, as Lieut. Baker is incapacitated and unable to earn his living, the action of curtailing

his pay and charging him with maintenance is the usual reward to an officer who has received wounds on active service?

Major-General Seely: The answers to the first four parts of the question are in the affirmative; the question of the amount of disability pension to which this officer will be entitled on relinquishment of his commission cannot be stated until the Ministry of Pensions are in a position to examine the case, but the normal rate for a lieutenant of the Royal Air Force who is fully disabled is £175 a year, plus a bonus of 20 per cent. from which a deduction of 4s. 6d. per day falls to be made if the officer is maintained in hospital. This officer has received the utmost advantage and consideration it is possible to give him under the existing Regulations. It has always been accepted that some definite period must be fixed during which an officer can be paid full pay before his case is taken over by Pensions Board. I am informed that that period (eighteen months) has been exceeded by six months in this case.

### Flookborough Aerodrome

Mr. TYSON WILSON, on July 28, asked the Secretary to the Admiralty whether he is aware that the construction of a large aerodrome was commenced at Flookborough during the war, that railway sidings were laid down and workmen's huts built, but that the same was discontinued owing to the then shortage of steel for constructional purposes; and whether he will consider the advisability of reconsidering this matter with a view to affording Messrs. Vickers, of Barrow, an opportunity of continuing to cater for this trade?

Dr. MacNamara: The statements in the earlier part of the question are in accordance with the facts. I am afraid it is quite out of the question for us to take up again the construction of this aerodrome. Existing accommodation is fully adequate to meet our needs. But as my hon. friend is probably aware, though we suspended the work on the shed, we did proceed with the housing accommodation, and the scheme is now nearing completion. I may add that we have offered Messrs. Vickers the option of taking over from us, on terms which I do not think are unfavourable, such work for the construction of the aerodrome as had been accomplished before the suspension.

### Sutton Aerodrome Discharges

Mr. GEORGE THORNE, on July 29, asked the Under-Secretary of State to the Air Ministry whether single women are being discharged from the Sutton Aerodrome, near Hornchurch, while married women whose husbands are in good positions are retained?

Major-General Seely: The inquiries in this case are not yet complete. I will communicate the result to the hon. member at an early date.

### German Airships for G.B.

Lieut.-Col. MOORE-BRABAZON asked the Under-Secretary of State to the Air Ministry how many German rigid airships will be allotted to this country under the terms of Peace; and whether the Air Ministry or the Admiralty will take the same over?

Major-General Seely: Under the Peace terms all German airships are to be handed over to the Allies, but the exact number to be allotted to this country has not yet been decided. The airships will be taken over in Germany by the Royal Air Force Section of the Inter-Allied Aeronautical Commission of Control; and their allotment as between the Admiralty and the Air Ministry will be determined by the decision made on the general question of responsibility for airships.

### Airships

Capt. WEDGWOOD BENN, on July 31, asked whether the Civil Aviation Department has under its control any airships; and, if not, what steps they will take to carry out experiments, in view of the commercial development of this type of aircraft?

Major-General Seely: The Air Ministry has not at present any airships under its control. Valuable experience was gained by the Ministry from the flights of the R 33 and R 34, but these vessels have now been returned to the Admiralty.

### Unified Control of Air Services

Captain W. BENN asked the Prime Minister (1) whether, in view of the proved value of airships for commercial purposes, the control of the airships could be transferred to the Civil Aviation Department of the Air Ministry; (2) whether the policy of the Government was that there should be unified control over the production of all material and the training of personnel for all aircraft whether lighter or heavier than air?

Lieut.-Col. MALONE asked the Prime Minister (1) when the construction of airships will be transferred from the Admiralty to the Air Ministry; (2) whether it is intended to divide the Air Service between the Admiralty and the Air Ministry?

Mr. Raper asked the Prime Minister whether he could make an announcement in reference to the transfer of the construction of airships to the Air Ministry?

Mr. JOYNTON-HICKS asked the First Lord of the Admiralty whether it was the intention of the Admiralty to transfer the manufacture of airships to the Air Ministry; and, if so, when?

Mr. Bonar Law: It has been decided that the lighter-than-air ships shall be transferred to the Air Ministry, and arrangements to carry this into effect are now being made.

Mr. Raper: Will they be transferred immediately or only on completion?

Mr. Bonar Law: The principle has been decided upon; the details are being arranged between the two Departments.

Lieut.-Commander Kenworthy: Will they be available for experiments in commercial work, or are they only for naval and military purposes?

Mr. Bonar Law: I could not be expected to answer that question. That will be for examination. One of the questions says, "Value for commercial purposes" but I was not aware of that.

Lieut. Col. Malone: Will they be transferred for operational purposes?

Major-General SEELY: I could not answer that off-hand. When these ships are employed for military purposes they will be under the command of appropriate military authorities, whether of the Navy or Army.

Mr. JOYNTON-HICKS: When arrangements are made will a statement be published here?

Mr. Bonar Law: We shall certainly make any announcement that we can. Whether it will be necessary to make it when the House is not sitting we will consider.

### Air Division of Naval Staff

Mr. JOYNTON-HICKS asked the First Lord of the Admiralty whether an Air Department is in existence at the Admiralty; and, if so, for what purpose?

The First Lord of the Admiralty (Mr. Long): There is no Air Department at the Admiralty. There is an Air Division of the Naval Staff, which advises as to air operations affecting Royal Air Force units working with the Fleet. This division is manned by Royal Air Force officers lent by the Air Ministry.

Lieut.-Col. Malone asked the First Lord of the Admiralty if he will state for what reasons aircraft, manned by Royal Air Force personnel, are continued under the control of the Admiralty?

Mr. Long : All aircraft which work in conjunction with the Navy are under the control of the Admiralty for operations.

Lieut.-Col. Malone asked the First Lord of the Admiralty whether the airships allotted for work with specific fleets are under the direct control of the Admiralty Air Department?

Mr. Long : No, Sir. Any airships allotted for work with the Fleet are under the direct control of the commander-in-chief.

#### Air Station, Felixstowe, Dismissals

Lieut.-Col. R. PEEL asked the Under-Secretary of State to the Air Ministry whether he is aware that 176 civilian employés at the air station, Felixstowe, received a week's notice to leave on Saturday last without having had any previous intimation that their services were likely to be dispensed with; and whether, in view of the obvious hardship which must occur from displacement at such short notice, he will take steps to make some concession

as to time so as to give the employés some reasonable chance of finding fresh employment?

Major-Gen. SEELY : The facts are as stated in the question. I deeply regret the hardship that is caused by the dismissal of civilian employés in this and similar cases, but the rapid reduction of the Royal Air Force to a peace basis renders such action unavoidable. Every effort will be made to give sufficient notice to enable men to find other employment, but such notice must in any case be short owing to the great reduction in working required to be done.

#### Government Policy

Mr. RAPEL asked the Prime Minister whether the Government adheres to the declaration of policy, made by the Secretary of State for War on February 12, that the integrity, the unity, and the independence of the Royal Air Force will be sedulously and carefully maintained?

Mr. Bonar Law : The answer is in the affirmative.



## SIDE-WINDS

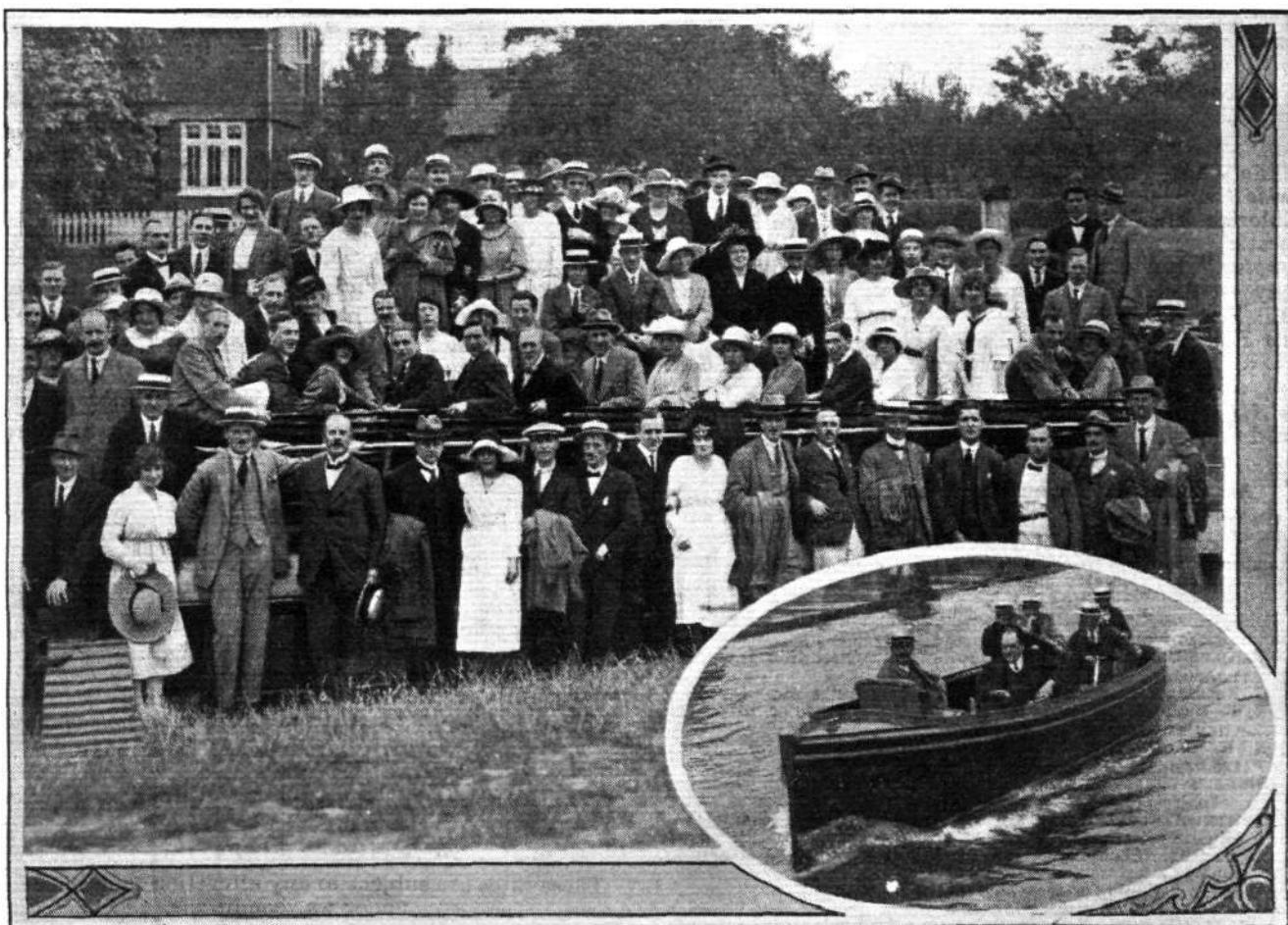
SOME little time back we referred to the enterprise of the Aircraft Manufacturing Co. in publishing a series of postcards of their machines. The second series is now to hand, and comprises pictures of Airco. types 1A, 2, 3, 4, 5 and 6. They are beautifully clear photographs in each case, and as the six cards only cost 1s. they are very reasonable. Sets can be obtained from the Aircraft Manufacturing Co., Ltd., Edgware Road, The Hyde, Hendon, N.W. 9. Series 3, comprising commercial machines 4A, 16, 17, 18, and 4R will be ready in a few days' time.

WE hear that Lieut. F. T. Courtney, late R.A.F., whose recent work, more especially on the Boulton and Paul "Bourges," will be well known to most readers, is now free to test new designs for other firms, or to make demonstration flights with post-War commercial types. Lieut. Courtney's flying on this machine, on the recent occasion of the aerial reception of Mr. Hawker at Hendon, will still be fresh in mind. It might be mentioned, as being possibly less well known, that Lieut. Courtney was with the Grahame-White Co. before the War, where he learned to fly. On the outbreak of War he went through the ranks of the R.F.C., and has had a lot of overseas experience. Later Lieut. Courtney was engaged at the Royal Aircraft Factory on testing, and he has had a great deal of experience of experimental flying. We need hardly add that for demonstrating the capabilities of

an aeroplane, Lieut. Courtney may be relied upon to get the very best possible results. We shall be pleased to pass on any enquiries.

ANOTHER well-known pilot, who is now open to accept engagements for testing and demonstrating machines, is Lieut. J. H. Moore, now demobilised after 3½ years' service in the R.F.C. and R.A.F. During the war he has been kept busy putting various types through their paces for the Air Ministry. He has flown practically every type of land machine built in England during the past five years, including twin-engine types, so he may be counted upon to "tool" any machine entrusted to him with an experienced hand. Mr. Moore is not only willing to fly anywhere in Great Britain, but is open to entertain propositions which would entail flying abroad. We shall be pleased to pass on any communications.

IN both the British and American navies the merits of Triplex are being recognised. The new Navy general specification for aircraft contains the following :— "Cockpits are required to be provided with a suitable windshield preferably of Triplex glass or equivalent." At a conference last week in Washington with some of the Naval aircraft officials, Triplex was specified for instrument dials on aviation instruments.



A couple of snaps on the occasion of the trip up the river of the staff of Messrs. S. Smith and Sons (M.A.), Ltd. Thanks to the attentive work of Mr. Dandie and Mr. Dilley, everyone had a thoroughly happy time. Inset, the Director's Launch.

## NEW COMPANY REGISTERED

BY AIR, LTD., 50, Earl Street, Coventry.—Capital £2,000, in £1 shares (1,000 preference). Under agreement with W. R. Johnson, T. T. Laker, J. W. Batchelor, and E. W. Saward, trading as the "Aerial Transport Co."

## PUBLICATIONS RECEIVED

*The Best Way to Learn Flying.* The London and Provincial Aviation Co., Stag Lane Aerodrome, Edgware.

*Punch Summer Number.* July 2, 1919. London: Bradbury, Agnew and Co., Ltd. Price 1s.

*Heat Treatment Bulletin, No. 12. The Location of Hardening Shop Faults.* By Fred. C. A. H. Lantsberry, M.Sc., F.I.C. The Automatic and Electric Furnaces, Ltd., 281-283, Gray's Inn Road, W.C.1.

*The Magnetic Sclerometer.* Automatic and Electric Furnaces, Ltd., 281-283, Gray's Inn Road, W.C.1.

*The North British Rubber Co., Ltd., and the Whitley Scheme: Inauguration of Works Committee.* North British Rubber Co., Ltd., Castle Mills, Edinburgh.

*The Scrounger.* No. 1, July 1, 1919. R.A.F. Detachment, Thetford. Price 6d.

*Willing's Press Guide, 1919.* London: James Willing, Ltd., 125, Strand, W.C. 2. Price 2s. net.

*Our Atlantic Flight.* By H. G. Hawker and Lieut.-Commander K. Mackenzie Grieve, R.N. London: Methuen and Co., Ltd. Price 3s. 6d.

*The New Traffic (Aircraft).* By W. H. Berry. London: Hurst and Blackett, Ltd., Paternoster House, E.C. Price 3s. 6d. net.

*The Ruthenian Question in Galicia.* By E. Lutoslawski and E. Romer. Paris: Rue de Rennes, 71.

*Aircraft Department, 1914-1919.* William Beardmore and Co., Ltd., Naval Construction Works, Dalmuir, Dumbartonshire.

*Sirocco Record in the War of 1914-1918.* Davidson and Co., Ltd., Sirocco Engineering Works, Belfast.

*Glossary of Aeronautical Terms, Prepared by the Technical Terms Committee of the Royal Aeronautical Society.* Edited by W. Barnard Faraday, LL.B. London: The Royal Aeronautical Society, 7, Albemarle Street, W. 1. Price 2s. 6d.

*An Apology for War Work.* Edgar Allen and Co., Ltd., Imperial Steel Works, Sheffield.

*Un Nouveau Système très Simple de Représentation Proportionnelle à Proportions Exactes.* By Charles Janet. Limoges: Librairie Ducourteux et Gout, 7 rue des Arenes.

*The Professional Photographer.* Kodak, Ltd., Kingsway, W.C. 2.

*Royal Automobile Club Year Book, 1919.* London: The Royal Automobile Club, Pall Mall, S.W.1. Price 5s. net.

## Catalogues

"Dunelt" Steels. Dunford and Elliott (Sheffield), Ltd., Attercliffe Wharf Works, Sheffield.

"Exide" Accumulators for Motor Car Starting and Lighting. The Chloride Electrical Storage Co., Ltd., Clifton Junction, Manchester.

"Surplus," No. 2, June 16, 1919. Surplus Government Property for Sale. Ministry of Munitions, Whitehall Place, S.W. 1. Price 3d.

*Motor Tools.* Tuck and Blakemore, Ltd., Coventry.

The 450 h.p. Napier Aero Engine. D. Napier and Son, Ltd., 14, New Burlington Street, W.1.

*Sage Aircraft: Aeroplanes, Seaplanes, Airships.* Frederick Sage and Co., Ltd., 58-62, Gray's Inn Road W.C. 1.

## Aeronautical Specifications Published

*Abbreviations:*—cyl.=cylinder; I.C.=internal combustion; m.=motors.

### APPLIED FOR IN 1917

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

*Published July 31, 1919*

13,303. BLACKBURN AEROPLANE AND MOTOR Co. and J. W. COBLEY. Connections for tension wires of aircraft. (129,000.)

13,377. DAIMLER Co. and A. E. BERRIMAN. Cylinders for aircraft engines. (129,007.)

13,613. G. BREWER. Releasing mechanism for parachutes, etc. (129,017.)

13,768. R. F. MACFIE. Indicator for land speed and angle of drift; also acting as bomb sight. (129,021.)

13,856. E. E. BROWN and D. J. MOONEY. Metal frames for aircraft. (129,023.)

14,014. SIDDELEY-DEASY MOTOR CAR Co. and F. M. GREEN. Landing-chassis. (129,029.)

14,080. BRITISH AEROPLANE VARNISH Co. and J. G. WARD. Solutions of cellulose esters. (129,033.)

14,115. A. V. ROE. Clamping-devices for ties of cross-braced structures. (129,034.)

14,126. A. MOND. Doping of aeroplane fabrics. (129,035.)

*Published August 7, 1919.*

14,443. A. A. MACGREGOR. Gyroscopic indicator for use in steering aircraft. (129,307.)

14,668. A. E. PARNACOTT. Means for lowering captive balloons or airships. (129,315.)

14,724. H. FOWLER, G. S. WILKINSON and A. G. PITTS. Lubrication of aero engines. (129,316.)

14,793. BLACKBURN AEROPLANE AND MOTOR Co., H. Booth and J. W. COBLEY. Deck flying wheels, etc., for aircraft. (129,317.)

14,819. SOC. DU CARBURATEUR ZENITH. Carburetors for aero motors. (129,318.)

14,864. BLACKBURN AEROPLANE AND MOTOR Co., H. Booth and A. E. MILLS. Aircraft and guns thereon. (129,319.)

14,935. H. SAUNDERS and H. ALEXANDER. Petrol and oil tanks. (129,320.)

15,045. SOPWITH AVIATION Co. and T. SOPWITH. Radiators. (129,322.)

15,221. E. R. CALTHROP. Means for destroying aerial craft. (129,329.)

15,387. NIEUPORT and GENERAL AIRCRAFT Co., H. L. HALL and C. A. SHARP. Application of dope to aircraft. (129,332.)

15,461. BLACKBURN AEROPLANE AND MOTOR Co., H. Booth and J. W. COBLEY. Control mechanism of aircraft. (129,335.)

15,464. R. A. WATT. Aerial circuits for wireless telegraphy. (129,336.)

15,496. F. H. PAGE. Driving of pumps, etc., on aircraft. (129,338.)

15,746. STABILIMENTI BIAK-ING. A. POUCHAIN. Aircraft propellers. (129,353.)

15,879. BLACKBURN AEROPLANE AND MOTOR Co. and H. Booth. Carrying of weights on aircraft. (129,359.)

15,941. G. CONSTANTINESCO. Actuating gun triggers on aircraft, etc. (129,362.)

16,146. R. ESNAUT-PELTERIE. Tanks of aircraft. (129,369.)

16,158. L. BECHEREAU. Means for driving propeller by several engines. (129,370.)

16,192. H. W. HILL. Sighting apparatus for use against aircraft. (129,372.)

16,503. E. BOYLE and A. PAYZE. Mounting guns on aeroplanes. (129,378.)

### APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

*Published July 31, 1919*

6,443. P. E. J. MINVALLA. Parachutes. (129,052.)

9,193. E. B. KILLEEN. Landing carriages. (129,071.)

11,098. F. J. MATEYKA. Parachute. (129,119.)

11,437. BLACKBURN AEROPLANE AND MOTOR Co. and H. Booth. Regulating cooling of I.C. aircraft engines. (129,128.)

11,822. A. CAIRNS. Propulsion of aerial machines. (129,142.)

12,606. J. G. NAVARRO. Steering and braking mechanism for aircraft. (129,149.)

13,913. BOULTON AND PAUL and J. D. NORTH. Loading and discharging devices for aircraft. (129,161.)

14,326. J. R. NORRINGTON. Buckle for safety belts. (129,164.)

*Published August 7, 1919.*

11,050. F. C. MEARS. Parachutes for use with aeroplanes. (129,416.)

11,299. BLACKBURN AEROPLANE AND MOTOR Co., and A. C. THORNTON. Control of I.C. engines for use on aircraft. (129,436.)

11,364. BLACKBURN AEROPLANE AND MOTOR Co., H. Booth and G. E. PETTY. Control devices for aircraft. (129,441.)

11,607 and 11,608. A. FLATTERS. Processes for doping fabrics and rendering them gas, water and fire-proof. (129,455 and 129,456.)

11,687. J. R. LITTLE. Locking, etc., of doors or partitions of aircraft sheds. (129,457.)

16,060. A. E. FESSELET and others. Multiplane heavier-than-air flying-machines. (129,528.)

16,110. G. CLOWES. Apparatus for adjusting or testing inclination or incidence of aeroplane wings. (129,530.)

### APPLIED FOR IN 1919

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

*Published August 7, 1919.*

3,783. M. J. B. BARBAROU. Carburetors. (129,586.)

5,132. D. J. MOONEY and D. H. EMBY. Construction of metal cross-members, etc., for aircraft. (129,596.)

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